

No. 7 — *The Chinese Caeneressa Species (Lepidoptera,
Ctenuchidae)*

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INTRODUCTION

Some years ago, while the author was doing research on Ctenuchidae and other Lepidoptera families at the Zoological Collection of the Bavarian State in Munich, he had an opportunity to study

not only the materials of that museum but also a very extensive collection from China gathered in the course of many years by the indefatigable investigator of the Lepidoptera of this country, Dr. H. Höne. This collection, now one of the most important components of the Institute of Zoological Research and Museum Alexander Koenig in Bonn, gave the author a basis for revision of several Chinese Ctenuchidae species in which he was especially interested. Further materials for this revision were found in collections of the Museum of Comparative Zoology in Cambridge, the American Museum of Natural History in New York, and the U. S. National Museum in Washington. The species of the related Oriental fauna were studied from the collections of the three last-mentioned museums and the State Museum of Natural History in Leiden. The necessary knowledge about the type specimens of Ctenuchidae from China, previously described by earlier authors, was received by the author from the British Museum (Natural History).

The new genus treated in this paper represents a small group of species ranging through China and the Oriental Region. These species have up to the present time been considered as belonging to the genus *Amata* F. from which they differ both in the structure of hind tibiae and in the male genitalia. The female genitalia could not be closely studied because the preparation of these parts involved the complete destruction of the markings of the abdomen which are very important for taxonomy of the *Caeneressa* species.

The present paper may be considered as a complete revision of the Chinese *Caeneressa* species, so far as they are known. Concerning some species ranging also beyond China, it was possible to add information about their distribution and geographical variation in other countries.

The author wishes to express his gratitude for the friendly cooperation of the Direction of the Zoological Collection of the Bavarian State in Munich (Germany) in the person of Prof. H. Krieg and the Curator of its Department of Entomology, Dr. W. Förster, and thus for the author's opportunity to devote most of his working-hours to research work. Heartly thanks also go to Dr. H. Höne of the Institute for Zoological Research and Museum Alexander Koenig in Bonn (Germany) for putting his rich collection at the author's disposal; Dr. P. J. Darlington, Jr.,

of the Museum of Comparative Zoology in Cambridge, Mass., and Dr. F. H. Rindge of the American Museum of Natural History in New York for the opportunity to study materials in these museums; Mr. J. F. Gates Clarke and Mr. W. D. Field of the U. S. National Museum in Washington, D. C., for a similar opportunity with respect to the materials of that museum; Dr. A. N. Diakonoff of the State Museum of Natural History in Leiden (The Netherlands) for sending moths for study; Mr. W. H. T. Tams of the British Museum (Natural History) in London for sending photographs of the type specimens of *Caeneressa* species in this museum and their genitalia, and for a great deal of work connected with this important aid; Mr. S. G. Kiriakoff of the Zoological Laboratories of the University of Ghent (Belgium) for some information about the above types; Mr. F. Daniel of the Zoological Collection of the Bavarian State for his continual assistance in the interpretation of labels in Dr. Höne's collection; Mrs. F. Tandler in Arlington, Va., for her kind assistance in the preparation of the English text of the present paper. The author acknowledges with thanks the support of his work on this paper by a research grant (1952) of the Research Program on the U.S.S.R. (East European Fund, Inc.) in New York; this grant gave him the opportunity to study the materials and the literature in the museums of the United States.

ABBREVIATIONS

The following abbreviations of the names of collections are used in the paper:

A.M.N.H., American Museum of Natural History, New York.

B.M., British Museum (Natural History), London.

M.C.Z., Museum of Comparative Zoology at Harvard College, Cambridge, Mass.

M.K., Institute for Zoological Research and Museum Alexander Koenig ("Zoologisches Forschungsinstitut und Museum Alexander Koenig, Reichsinstitut"), Bonn, Germany.

M.L., State Museum of Natural History ("Rijksmuseum van Natuurlijke Historie"), Leiden, The Netherlands.

U.S.N.M., U.S. National Museum, Washington.

Z.C.M., Zoological Collection of the Bavarian State ("Zoologische Sammlung des Bayerischen Staates"), Munich, Germany.

SYSTEMATIC DESCRIPTIONS

CAENERESSA, new genus

- Syntomis* (part.) Kollar, 1848, Hügel's Kaschmir, 4 (2), p. 460; Walker, 1854, List Spec. Lep. Ins. B. M., 1, p. 117; Herrich-Schäffer, 1858, Samml. neuer oder wenig bekannt. aussereurop. Schmett., p. 72; Felder, 1862, Wien. Ent. Mschr., 6, p. 37; Moore, 1871, Proc. Zool. Soc. London, p. 244; Butler, 1876, J. Linn. Soc. London, Zool., 12, p. 344; 1877, Illustr. Het. B. M., 1, p. 17; Moore, 1878, Proc. Zool. Soc. London, p. 845; 1878, Anderson's Res. W. Yunnan, p. 296; Poujade, 1886, Bull. Soc. Ent. France (6), 6, p. CXVII; Swinhoe (and Cotes), 1887, Cat. Moths Ind., p. 45; Leech, 1889, Trans. Ent. Soc. London, p. 123; Hampson, 1892, Fauna Brit. India, Moths, 1, p. 212; Swinhoe, 1895, Trans. Ent. Soc. London, p. 30; Hampson, 1897, J. Bombay N. H. Soc., 11, p. 284; Leech, 1898, The Entom., 31, p. 152; 1898, Trans. Ent. Soc. London, p. 319; Hampson, 1898, Cat. Lep. Phal., 1, p. 59; 1900, J. Bombay N. H. Soc., 13, p. 46; Piepers en Snellen, 1904, Tijdschr. v. Ent., 47, p. 51; Seitz, 1909, Gross-Schm. Erde, 2, p. 38; Matsumura, 1911, Thousand Ins. Jap., Suppl., 3, p. 69; Zerny, 1912, Wagner's Lep. Cat., 7, p. 12; Seitz, 1912, Gross-Schm. Erde, 10, p. 67; Van Eecke, 1925, Zool. Meded. Rijksmus. Leiden, 8, p. 208; Draeske, 1926, Iris, 40, p. 45; Wileman, 1929, Trans. Ent. Soc. London, 76, p. 420; Matsumura, 1931, 6000 Illustr. Ins. Jap., p. 995; Kawada, 1934, Cat. Ins. Jap., 5, Lep. Syntomidae, p. 1; Wu, 1938, Cat. Ins. Sin., 4, p. 629; Sonan, 1941, Trans. N. H. Soc. Formosa, 31, p. 95.
- Hydrusa* (part.) Swinhoe, 1891, Trans. Ent. Soc. London, p. 473; 1892, Cat. East. and Austral. Lep. Het., 1, p. 50; Kirby, 1892, Synon. Cat. Lep. Het., 1, p. 902; Hampson, 1892, Fauna Brit. India, Moths, 1, p. 220; 1898, Cat. Lep. Phal., 1, p. 66; Kiriakoff, 1954, Ann. Mus. Congo Tervuren, in 4°, Zool., 1, p. 431.
- Zygaena* (part.) Kirby, 1892, Synon. Cat. Lep. Het., 1, p. 89.
- Eressa* (part.) Hampson, 1892, Fauna Brit. India, Moths, 1, p. 221; Swinhoe, 1895, Trans. Ent. Soc. London, p. 32.
- Amata* (part.) Rothschild, 1910, Novit. Zool., 17, p. 433; 1912, *ibid.*, 19, p. 375; Hampson, 1915, Cat. Lep. Phal., Suppl., 1, (1914), p. 13; Fletcher, 1925, Cat. Ind. Ins., 8, p. 6; Matsumura, 1927, J. Coll. Agr. Hokkaido Univ., 19, p. 74; Candèze, 1927, Enc. Ent. (B), Lepidoptera, 2, p. 74; Joannis, 1928, Ann. Soc. Ent. France, 97, p. 245.

Head rather roughly sealed, the frons usually a little more smooth. Antennae bipectinate or serrate in the male, serrate or simple in the female, sometimes simple in both sexes, always ciliate. Palpi labiales porrect, rather short, roughly sealed,

with a subacute terminal joint. Proboscis moderately long, weak. Legs smooth, only the coxae somewhat rougher scaled from the exterior side; hind tibiae without middle spurs, with a pair of terminal ones only. Abdomen smoothly scaled.

Forewing moderately broad, dilated outward; dorsum nearly two thirds as long as the costa; termen straight or slightly convex; 12 veins; R_1 to R_5 stalked; M_1 from upper angle of the middle cell; M_2 and M_3 shortly stalked, connate or slightly separate, from the lower angle of the middle cell; Cu_1 from well before the angle of the middle cell; Cu_2 from more or less behind the middle point of the middle cell; A_2 more or less arched, extends to the tornus.

Hindwing subovate, shorter than the forewing dorsum; 5 veins; Sc coincident with R and M_1 , to the costa; M_2 and Cu_1 connate or shortly stalked, from the lower angle of the middle cell; Cu_2 from cell near three fourths, remote from Cu_1 ; A_2 to the tornus.

Pattern of the Body and Wings. In their pattern the *Caeneressa* species are similar to most other Ctenuchidae genera of the Eastern Hemisphere. The predominant scaling of the head and body is black or dark brown, often with a blue, greenish or violet, silk or metallic reflection. The markings are formed by white, yellow, orange, or red scaling on the dark ground; sometimes the dark scaling is completely replaced by these colored scales or pushed into the background. On the head the colorous markings may be represented as a patch on the frons, also as streaks on the cheeks; exceptionally the dark ground of the head is completely taken over by the colorous scaling. On the patagia the dark ground is often similarly replaced, or they are patched with color. The tegulae are usually more or less widely patched with color, sometimes without any black. On the thorax colorous markings (streaks and patches) are often present; the pectus usually with lateral patches. The interior side of the coxae and some other parts of the legs are often colored, especially in the males. The pattern of the abdomen is formed of variously developed transverse segmental bands and girdles, complete or interrupted on the dorsal or ventral surface; longitudinal lines are also sometimes present. The scaling of the body and its parts is never more than trichromatic, usually it is bichromatic.

The wing pattern of *Caeneressa* is similar to that of *Amata* F. and formed by hyaline spots on a dark ground. In this way, the wing pattern scheme of this latter genus (cf. Obraztsov, 1935, Ent. Anz., 15, p. 262; 1941, Univ. Kijev., Acta Mus. Zool., 1, (1939), p. 114) can be used also in *Caeneressa*. In the forewing a triangular spot (m_2) is in the middle cell. A more or less long spot ($m_1 + m_3$ of the *Amata* wing pattern scheme) is below the middle cell, in the interspace between it and the vein A_2 ; an ovate or more or less elongate spot (m_4) is in the basal part of the interspace between the veins R_5 and M_1 ; two spots (m_5 and m_6) are in the basal parts of the interspaces between the veins M_2 and Cu_1 . These last two spots are separated from one another by the vein M_3 . Some smaller extra spots are often present; they occur near the basal parts of the interspaces over the vein R_5 and below the vein M_1 , also at the outer angle formed by the vein Cu_2 and the middle cell. The subcostal area is sometimes hyaline, the supradorsal area pale scaled.

In the hindwing a basal spot is present. It occupies the interspace between the middle cell, vein Cu_2 and A_2 . This spot usually crosses over the vein A_2 and reaches almost to the wing dorsum. Not infrequently it also crosses over the lower vein of the middle cell which latter is in this case at least partly hyaline. The second hindwing spot is a distal one. It occupies the basal part of the interspace between the veins Cu_1 and Cu_2 and the middle cell. This spot usually crosses over the vein Cu_1 and reaches to the vein M_2 . In case both spots of the hindwing are enlarged and confluent, they occupy most of the surface of the wing, and the hindwing becomes hyaline with dark borders.

Frequently all wing spots are very enlarged, and the wings become predominantly hyaline. In this instance, the dark ground of the forewing is reduced to a discal patch and borders along the wing margins. These borders are usually dilated at the wing apex, often also between the veins Cu_1 and Cu_2 . A dark ray along the vein M_2 usually connects the forewing borders with the discal patch. In the hindwing these borders are mostly dentate at the veins Cu_1 and Cu_2 . The veins of both wings are always more or less dark.

The wing pattern is bifacial and the under surface matches the upper one. Exceptionally the dark interspaces of the under wing surface are lightened by yellow, whitish or other scales.

Male Genitalia (Fig. 1). Uncus long, more or less curved; tegumen simple or with lateral appendages; sacculus variously

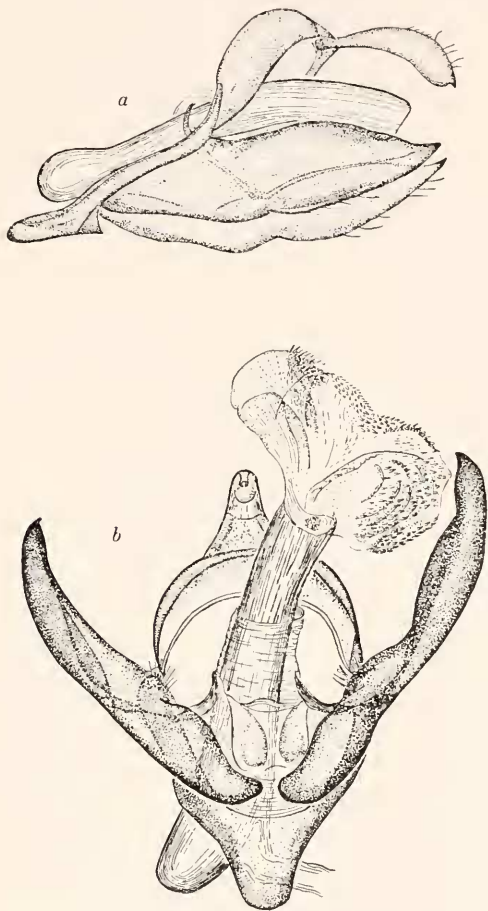


Fig. 1. Male genitalia of *Caeneressa diaphana* (Koll.); preparation no. 2 (M.C.Z.).

a, lateral view; *b*, ventral view.

long, at least moderate. Valvae elongate, variously shaped, sometimes slightly asymmetrical, in this instance the left valva is shorter; the upper edge of the valva (costa) mostly indifferently; sacculus more or less thickened, distally rounded, without a free apical point; interior side of the valvae connected with the vallum penis by more or less long processus basales. Vallum penis membranous, only the fultura inferior sclerotized, variously shaped. Aedoeagus moderate or long, more or less straight or slightly curved; coecum penis moderate or underdeveloped; vesica with a cuneus of numerous, little, chitinous spines, or with well developed elongate cornuti, sometimes with both.

Female Genitalia (Fig. 2). The seventh abdominal segment with a broad, strongly sclerotized tergite and a narrow, less sclerotized sternite; it forms caudad a wide, roundish opening into which the papillae anales are retracted in the position of rest. The postsegmental edge of the seventh sternite with a wide indentation displaced to the left which borders with the ostium bursae. The bottom of the sinus vaginalis membranous, with a narrow, arched sclerite cephalad from the ostium bursae, between it and the postsegmental edge of the seventh sternite. The eighth segment in form of a narrow ring, with a tergite more sclerotized; the eighth sternite semimembranous and forms a kind of medial ventral plate slightly widened at the middle. The narrow, lateral commissurae of both eighth tergite and sternite joined into rather short apophyses anteriores. The papillae anales soft, hairy, broad coniform, the apophyses posteriores nearly three times as long as the apophyses anteriores. Two short, narrow papillae genitales between the papillae anales.

Corpus bursae round, membranous, with a large, dented, sclerotized signum dilated cephalad and constricted and pointed caudad. Cervix bursae wide, with a broad lateral appendix joined to the ductus seminalis. Ductus bursae rather narrower than the cervix, constricted and being stronger near the wide ostium bursae.

The above description of the female genitalia was made from *Caeneressa diaphana* (Koll.) only, and it is not safe to say that it may relate to all species of the genus.

Systematic Position. The new genus *Caeneressa* is closely related to *Eressa* Wkr., *Trichaeta* Swinh. and *Amata* F., and in

the system has to be ranked among this generic group of the Ctenuchidae. From *Eressa* it differs chiefly in the veins M_2 and Cu_1 connate or stalked on the hindwing; the male genitalia

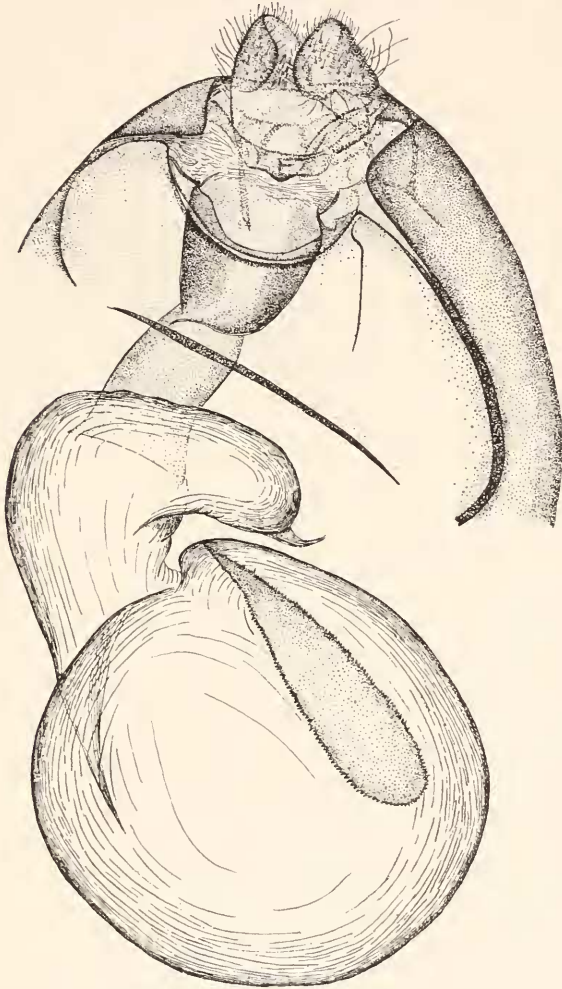


Fig. 2. Female genitalia of *Caeneressa diaphana* (Koll.); preparation no. Ct. 9 (M.L.).

of *Caeneressa* are similar to those of the *multigutta* group of *Eressa*. The new genus resembles especially *Trichaeta*, but differs from it in the absence of the lateral hair-tufts on the abdomen, and in genitalia. The features distinguishing *Caeneressa* from *Amata* consist of the absence of the middle spurs of the hind tibiae and of the male genitalia. The latter in *Caeneressa* do not have any developed upper angle of the valva, and the cornuti are never numerous and ranged in a longitudinal row, both of which features are so typical for *Amata*.

Range. Information about the geographical distribution of the genus *Caeneressa* is currently very insufficient, in so far as the systematic position of many non-Palaearctic species ranked under *Amata* F. is not proved. About the non-Palaearctic species of the new genus it is only known at present that *albifrons* Moore, *actea* Swinh., *oenone* Bthr., *era* Swinh. and *serrata* Hmps. belong to *Caeneressa*. In the Palaearctic region the genus is represented by thirteen species, seven of them new.

The range of the genus *Caeneressa* is restricted to China (with the north extremity of distribution reaching the southern part of the province of Shensi), North India, Burma, Indo-China, Chusan, Formosa, and the Great Sunda Islands. The most widely distributed species of the genus is *diaphana* Koll. found in almost all parts of this range, while the distribution of other species is very restricted. Except for *diaphana*, all species known to be from China are endemics of this fauna. They have been found in the provinces of Shensi, Szechwan, Kweichow, Yunnan, Anhwei, Hunan, Kiangsu, Chekiang, Kiangsi, Fukien, and Kwangtung. It is very probable that they may be present also in other provinces which have been studied only to a very limited extent. There is evidence that *rubrozonata* Pouj. and *diaphana* Koll. are the most widely distributed *Caeneressa* species in China, although it would be premature to deny wide distribution with respect to the rest of the species of this genus.

Key to the Species,

Based on External Characters

1. Antennae bipectinate in the male, serrate in the female2
- Antennae serrate in the male, simple in the female, sometimes simple
in both sexes12

2. Abdomen with only transverse, yellow or red bands seldom joined together at the middle line3
Abdomen with transverse bands and in addition with longitudinal lateral lines13
3. No red sealing on any part of the head and body4
Head, patagia, tegulae, thorax, and abdomen with red sealing on a black ground*ningyuena*, n. sp.
4. Frons white or greyish5
Frons yellow or black6
5. Patagia black; the elongate spot below the middle cell of the forewing extends farther outward than the spot in the middle cell
.....*proxima*, n. sp.
Patagia yellow; the elongate spot below the middle cell of the forewing extends no farther outward than the spot in the middle cell
.....*pratti* Leech
6. Patagia black7
Patagia yellow, at least laterally10
7. Hyaline areas between the forewing veins M_2 and Cu_1 extend to the middle cell8
Hyaline areas between the above-mentioned veins formed as separate spots which do not reach to the middle cell9
8. Thorax with a posterior yellow patch; first abdominal tergite with lateral yellow patches*hoenei*, n. sp.
Thorax without a posterior yellow patch; first abdominal tergite broadly yellow*zernyi*, n. sp.
9. Frons black; tegulae yellow with black end-hair; hindwing with a broad hyaline area*obsoleta* Leech
Frons diffusely yellow sealed; tegulae yellow only on shoulders; hindwing with two separate hyaline spots*klapperichi*, n. sp.
10. Some of the yellow abdominal bands narrower at the middle
.....*oenone* Btlr.
The yellow abdominal bands not narrower at the middle11
11. Head yellow; subcostal area of the forewing hyaline ...*dispar*, n. sp.
Head black; subcostal area of the forewing black*swinhoei* Leech
12. Abdomen with transverse bands and also with yellow or red longitudinal lines13
Abdomen with yellow transverse bands only*diaphana* Koll.
13. Tegulae yellow or red, at least on shoulders14
Tegulae black*graduata* Hmps.
14. Abdomen besides two dorso-lateral yellow lines with a medio-dorsal, longitudinal, yellow line; tegulae entirely yellow ...*tiennushana*, n. sp.
Abdomen with two dorso-lateral, longitudinal, yellow or red lines only; tegulae with some black, at least in the end-hairs ...*rubrozonata* Pouj.

*Key to Male Genitalia*¹

1. Processus basales of the valvae reach no farther than to the vallum penis 2
 Processus basales of the valvae extend far over the vallum penis.....
 *zernyi*, n. sp.
2. Uncus dilated distally, shaped like a turkish broadsword 3
 Uncus not dilated distally 7
3. Aedoeagus with a euneus of numerous, little spines 4
 Aedoeagus with one or two cornuti 5
4. Uncus with a short, pointed tip *diaphana* Koll.
 Uncus with a long, pointed tip *oenone* Btlr.
5. One cornutus 6
 Two cornuti *rubrozonata* Pouj.
6. The left valva shorter; saecus rather long *tienmushana*, n. sp.
 Both valvae almost equally long; saecus short *graduata* Hmps.
7. Saecus broad, rather short 8
 Saecus rather narrow, more or less long 10
8. Cornuti large, strong 9
 Instead of cornuti, two pairs of longitudinal rows of numerous short
 cones *proxima*, n. sp.
9. Tips of both valvae curved inward; the distal cornutus very broad at
 the base *pratti* Leech
 Tips of valvae straight; the distal cornutus an almost regular cone ...
 *klapperichi*, n. sp.
10. Distal part of the valva with two angles 11
 Distal part of the valva with an acute point 12
11. The left valva distinctly shorter than the right one; its lower angle
 acute *hoenei*, n. sp.
 Both valvae almost equally long; the lower distal angle of the left
 valva broad, stout *swinhoei* Leech
12. Tegumen simple; the upper edge of the valva with an acute point; one
 cornutus *obsoleta* Leech
 Tegumen with lateral appendages; the upper edge of the valva equally
 arched; three cornuti *dispar*, n. sp.

1. CAENERESSA PROXIMA, new species

Pl. 1, figs. 1-3

Male. Antennae bipectinate, black, the apical part of the shaft white. Head black; frons white. Patagia black; tegulae orange-yellow (at least on the shoulders), black bordered. Thorax black

¹ No material available for *ningyuena*, new species, described from a female.

with a narrow, orange-yellow, posterior edge; pectus with two yellow patches on each side. Legs concolorous with the body or slightly paler; the interior side of the fore coxae white; fore tibiae sometimes with white, longitudinal streaks; tarsi more or less long whitish at the base. Abdomen black-brown, shot with greenish or violet; first tergite orange-yellow; second to sixth tergites (incl.) usually with incomplete, orange, postsegmental bands, the fifth segment mostly with such a complete girdle; the corresponding sternites with complete, orange-yellow bands. Wings brownish black, with a dull, violet gloss; spots white-hyaline. Length of the forewing: 25-29 mm.

In the forewing a rather long, wedge-shaped spot (m_2) in the middle cell; a long spot (m_{1+3}) below it which extends much farther outward than the distal edge of the spot in the middle cell; a long spot (m_4) between the veins R_5 and M_1 , with two longish extra streaks over these veins; two much broader, egg-shaped spots (m_5 and m_6) between the veins M_2 and Cu_1 separated from each other by the black vein M_3 ; the upper of these spots slightly shorter than the lower one; a more or less developed, oval extra spot at the base of the vein Cu_2 , outward from the long basal spot (m_{1+3}).

The hindwing with a large basal spot which extends from the middle cell to the vein A_2 and is accompanied by a streak behind this vein; a distal spot, almost equal in size to the basal one, more or less separated from it, divided by the black vein Cu_1 into two unequal parts.

Female. Similar to the male. Antennae serrate. Fore coxae entirely black. The orange-yellow band on the sixth abdominal segment mostly absent. The subcostal area of the forewing whitish hyaline, the supradorsal area sometimes whitish.

Male Genitalia (Fig. 3). Tegumen elongate, moderately arched; uncus long, slightly curved downward; saccus broad and large. Valvae almost symmetrical, with a strong, thickened sacculus; distal edge of the valva dentate; the whole valva equally narrowed toward the rounded tip; processus basales curved, extending to the upper part of the vallum penis. Fultura inferior bottle-shaped. Aedoeagus rather thick, moderately curved downward, funnel-shaped at the tip; coecum penis rudimentary, broad; cuneus of numerous short cones forming two pairs of longitudinal rows.

Types. Holotype, male, Lienping, Province Kwangtung, May, 1922, H. Höne (genitalia preparation no. S.050; M.K.); allotype, female, Hoengshan, Province Hunan, May 29, 1933, H. Höne (M.K.); paratypes, two males, Lienping, Province Kwangtung, May, 1922, H. Höne (M.K. and Z.C.M.).

Additional material examined. Two females, Yenping, Province Fukien, June 13, 1917 (A.M.N.H.); one female, Nanking, Province Kiangsu, June 15, 1933, H. Höne (Z.C.M.).

Range. Chinese provinces Kwangtung, Fukien, Hunan, and Kiangsu.

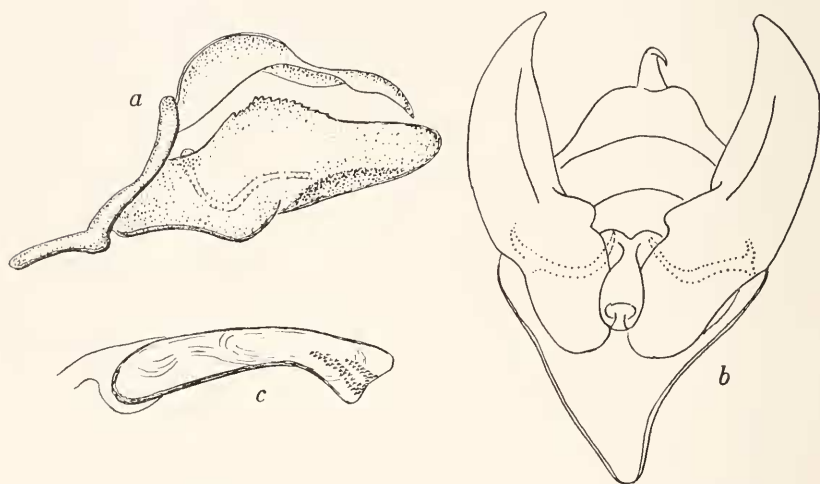


Fig. 3. Male genitalia of *Caeneressa proxima*, new species; preparation no. S.050 (M.K.).

a, lateral view; *b*, ventral view; *c*, aedeagus.

Remarks. Superficially very similar to *pratti* Leech and *klapperichi*, n. sp., except for a much longer forewing spot (m_1+t_3) below the middle cell. Moreover, *proxima* can be distinguished from *pratti* by the black color of the patagia and dissimilar color of the fore coxae. The markings of the abdomen of *proxima* are unlike those of *klapperichi*; also the frons sealing is white, not yellowish as in this species.

2. CAENERESSA KLAPPERICHI, new species

Pl. 1, figs. 7, 8

Male. Antennae bipectinate, black, the apical three-fourths of their shafts white. Head black; frons diffusely pale-yellow scaled. Patagia and tegulae black, the latter with yellow shoulders. Thorax violet-brown, with a narrow, yellow, posterior edge; pectus with two yellow patches on each side. Legs concolorous with the body; the interior side of the fore coxae whitish yellow; tarsi whitish scaled. Abdomen violet-brown; first tergite orange-yellow; second to seventh segments (incl.) with complete, orange-yellow, postsegmental girdles. Wings brownish black with a coppery gloss; spots white-hyaline. Length of the forewing: 21 mm.

In the forewing a rather short, wedge-shaped spot (m_2) in the middle cell; an elongate spot (m_{1+3}) below it extends farther outward than to the middle of the above spot; an almost equally broad, elongate spot (m_4) between the veins R_5 and M_1 , with two much smaller, elongate extra spots over these veins; two rather short, egg-shaped spots (m_5 and m_6) between the veins M_2 and Cu_1 separated from each other by the black vein M_3 ; the upper of these spots slightly shorter than the lower one.

The hindwing with a rather large, roundish basal spot which extends from the middle cell almost to the dorsum; a separate distal spot divided by the black vein Cu_1 into two unequal parts; the middle cell whitish scaled.

Female. Similar to the male. Antennae serrate. Yellow of the tegulae only slightly developed. Abdomen with the first tergite orange-yellow; similarly colored, incomplete, postsegmental bands on the fourth and fifth segments. Forewing broader than in the male, all spots larger; the extra spot located between the spots m_4 and m_5 contiguous with both; a little extra spot above the base of the vein Cu_2 ; the subcostal area hyaline. The middle cell of the hindwing partly hyaline. Length of the forewing: 26 mm.

Male Genitalia (Fig. 4). Tegumen strongly arched; uncus long, dilated at the middle, strongly curved downward; saccus short. Valvae almost symmetrical, with a narrow, slightly thickened sacculus; distal edge of the valva dentate; the whole valva

equally narrowed toward the truncate tip; processus basales angularly curved, hardly reaching with their tips to the vallum penis. Fultura inferior subquadrate. Aedoeagus rather short and thick, with a coecum penis directed downward; a large, thick, claw-shaped cornutus on the tip of the vesica, and a much shorter one at its middle; some fine, sclerotized dotting at the bases of these cornuti and above the second of them.

Types. Holotype, male, Kuantun, Province Fukien, 2300 m. alt., June 16, 1938, J. Klapperich (genitalia preparation no. S.046; M.K.); allotype, female, the same locality, June 20, 1938, J. Klapperich (M.K.).

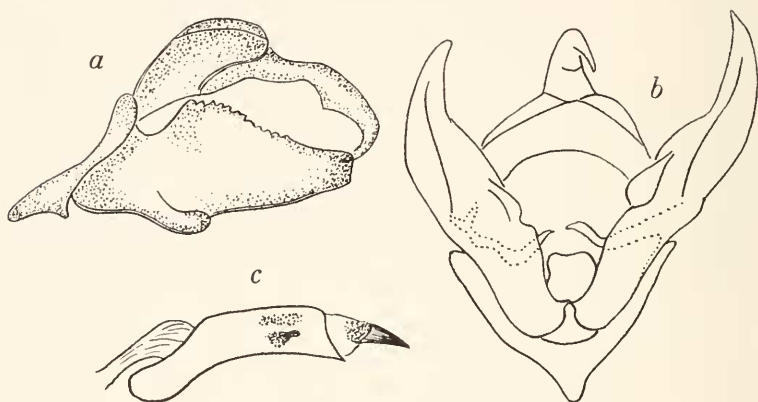


Fig. 4. Male genitalia of *Caencressa klapperichi*, new species; preparation no. S.046 (M.K.).

a, lateral view; *b*, ventral view; *c*, aedeagus.

Range. The species is known from the above locality only.

Remarks. The appearance of this new species is very like that of *pratti* Leech and *proxima*, n. sp.; *klapperichi* is especially closely related to the first of these species. It is likely that *klapperichi* may be a geographical subspecies of *pratti*, but in view of our scanty knowledge of both at present, it is better to consider them provisionally as two independent species. Superficially both are distinctive in the coloring of the frons and patagia, also in a dissimilar pattern of the abdomen. The distinguishing features in the male genitalia are given in the *pratti*

description. As to the distinction between *klapperichi* and *proxima*, refer to the remarks on this latter species.

3. CAENERESSA PRATTI (Leech, 1889), new combination

Pl. 1, figs. 4, 5

Syntomis pratti Leech, 1889, Trans. Ent. Soc. London, p. 123, pl. 9, fig. 3; 1898, *ibid.*, p. 325; Hampson, 1898, Cat. Lep. Phal., 1, p. 64; Seitz, 1909, Gross-Schm. Erde, 2, p. 40; Zerny, 1912, Wagner's Lep. Cat., 7, p. 25; Wu, 1938, Cat. Ins. Sin., 4, p. 632. — ORIGINAL DESCRIPTION: "Allied to *Syntomis muirheadii*, Feld., to which species it bears a strong superficial resemblance, but is separated therefrom by having only two hyaline spots towards base of primaries, and blackish margins to abdominal fold of secondaries. There is no yellow patch on the posterior edge of thorax, but one is situated band-like on first segment of abdomen, and this is followed by five yellow belts in the male and four in female. These last are interrupted on the back of the female by a stripe of the blackish ground colour. Antennae strongly pectinated in the male, a character which at once distinguishes it from male *S. muirheadii*. Expanse, ♂ 47 mm., ♀ 56 mm." (Leech, 1889).

Zygaena pratti Kirby, 1892, Synon. Cat. Lep. Het., 1, p. 95.

Male. Antennae bipectinate, black, the apical half of the shaft white. Head black; frons white. Patagia and tegulae yellow, the latter bordered with black. Thorax black; pectus with two yellow patches on each side. Legs concolorous with the body or slightly paler; the interior side of the fore coxae yellowish white, the base of the tarsi whitish. Abdomen brownish black; the entire first tergite orange-yellow; second segment with orange-yellow, lateral patches on the tergite and a similarly colored, complete, postsegmental band on the sternite; third to sixth segments (incl.) with complete, orange-yellow, postsegmental girdles, paler on the ventral surface. Wings brownish black, spots white-hyaline. Length of the forewing: 23 mm.

In the forewing a rather short, wedge-shaped spot (m_2) at the end of the middle cell; an elongate spot (m_{1+3}) below it reaches about to a point on a level with the middle of the middle cell spot; a rather narrow, elongate spot (m_4) between the veins R_5 and M_1 accompanied by two short, hyaline streaks above and beneath; two shorter but broader, egg-shaped spots (m_5 and m_6) between the veins M_2 and Cu_1 separated from

each other by the black vein M_3 ; the upper of these spots is slightly longer than the lower one.

The hindwing with a large basal spot which begins in the middle cell and extends almost to the dorsum; a smaller distal spot separated from the basal spot by a transverse black bar and divided by the black vein Cu_1 into two unequal parts.

Female. Similar to the male. Antennae serrate. Frons greyish white. Patagia black, yellowish at sides. First tergite of the abdomen orange-yellow, second to fifth tergites (incl.) with similarly colored, broad lateral patches; the corresponding sternites with paler yellow postsegmental bands. The subcostal area of the forewing whitish hyaline. Length of the forewing: 26-28 mm.

Male Genitalia (Pl. 1, fig. 6). Like those of *klapperichi*, n. sp., but the valvae tips strongly curved inward. Fultura inferior more elongate. The distal cornutus narrower but more dilated at the base; the proximal cornutus slightly longer than in *klapperichi*.

Types. Holotype, male, and allotype, female, Kiukiang, Province Kiangsi, June, 1887 A. E. Pratt (genitalia preparation of the holotype no. 221; B.M.).

Additional material examined. One female, Province Kiangsi, June 15 (A.M.N.H.).

Range. Chinese province of Kiangsi.

Remarks. Very similar to both preceding species whose distinguishing features are discussed above. The resemblance of *pratti* to *diaphana* Koll. ssp. *muirheadii* Fldr. with which this species has been compared by Leech (1889) is very remote and neither can be mistaken for the other. The hyaline wing spots in *muirheadii* occupy a larger surface, the supplementary elements of the markings are more developed, the abdominal girdles more numerous. In addition to these differences and those in the male genitalia, the antennae of *muirheadii* are serrate in the male and simple in the female.

4. CAENERESSA OBSOLETA (Leech, 1898), new status and combination

Pl. 2, figs. 7-9

Syntomis swinhoei ab. *obsoleta* Leech, 1898, The Entom., 31, p. 152. — ORIGINAL DESCRIPTION: "In this form the upper hyaline spot of the

subapical trio is absent, and also the spot between the interno-median bar and the two submarginal spots; the border of secondaries is broader. Expanse, 34 millim." (Leech, 1898).

Syntomis actca ab. *obsoleta* Zerny, 1912, Wagner's Lep. Cat., 7, p. 19; Seitz, 1913, Gross-Schm. Erde, 10, p. 74.

Male. Antennae bipectinate, black, one-fourth white-tipped. Head and patagia entirely black; tegulae yellow with black end-hairs. Thorax black with a large, yellow, posterior patch; pectus with a faint-yellow patch on each side. Legs black, the interior surface of the coxae yellow. Abdomen violet-black; first tergite yellow, at the middle broadly interrupted by black; yellow, post-segmental bands on second to seventh segments (incl.), enlarged medio-dorsally and ventro-laterally, sometimes absent on fifth and sixth sternites. Wings black, spots white-hyaline. Length of the forewing: 17-19 mm.

In the forewing a long, wedge-shaped spot (m_2) in the middle cell; below it a long, more or less broad, slightly arched spot (m_{1+3}) which extends from near the wing base to about three-fourths of the dorsum; an elongate-ovate spot (m_4) above the base of the vein M_1 , accompanied by a small, slightly elongate extra spot below this vein, and sometimes also by a little dot above the base of the vein R_5 ; two spots (m_5 and m_6) in the interspaces of the veins M_2 and Cu_1 , egg-shaped, dilated toward outside, the lower of them slightly broader and longer, separated from each other by the black vein M_3 ; sometimes a little, ovate, extra spot above the base of the vein Cu_2 .

The hindwing spots form a common hyaline area bordered by black; these borders are broad at the costa, dilated at the apex, with an obtuse tooth at the vein A_2 .

Female. Similar to the male but with antennae serrate. The eyes circumciliated with yellow. The interior surface of the coxae black. First abdominal tergite with two yellow, lateral patches and a similarly colored streak at the middle; second to sixth segments (incl.) with yellow bands dilated medio-dorsally and ventro-laterally, the two posterior ones sometimes reduced or absent.

Male Genitalia (Fig. 5). Tegumen moderately arched; uncus long, undulate, with a short tip curved downward; saccus long, narrow. Valvae symmetrical; sacculus large, thickened, with a round tip; upper edge of the valva almost straight; an acute

projection between it and the irregularly concave distal edge; valva tip truncate, with a prolonged, acute, distal angle; processus basales extend to the vallum penis, their tips dilated. Fultura inferior elongate. Aedoeagus slender and long, slightly curved downward at coecum penis and upward at the tip; a single, grain-shaped cornutus.

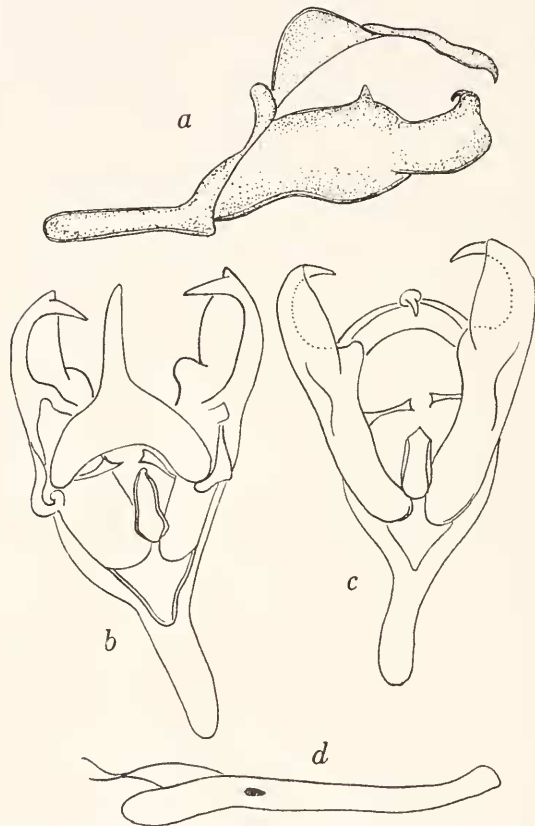


Fig. 5. Male genitalia of *Caeneressa obsoleta* (Leech); preparation no. S.049 (Z.C.M.).

a, lateral view; *b*, dorsal view; *c*, ventral view; *d*, aedoeagus.

Type. Holotype, female, Ningpo, Province Chekiang, July, 1886 (B.M.).

Additional material examined. Two males and four females, Kuantun, Province Fukien, 2300 m. alt., May 19 till June 11, 1938, J. Klapperich (M.K.); one male and one female, the same data (preparation of the male genitalia no. S.049; Z.C.M.).

Range. Chinese provinces of Chekiang and Fukien; Chusan Islands.

Variation. The nominate form of the species was described as having a single extra-spot below the forewing spot m_4 . Most of the specimens examined from Kuantun are like the type, others have extra spots above and beneath the spot m_4 . Sometimes another extra spot, on the outer side of the forewing spot m_{1+3} is present. A male specimen from Kuantun (May 20, 1938) lacks extra spots completely.

Remarks. This species was established by Leech as an aberration of *swinhoei* Leech and considered by later authors as belonging to *actea* Swinh. but it has nothing to do with either of these species. It bears rather some likeness to *proxima*, n. sp., but is much smaller and with no spot on the frons, has dissimilar markings of the abdomen and very distinct genitalia.

5. CAENERESSA SWINHOEI (Leech, 1898), renewed status and new combination

Pl. 2, figs. 4, 5

Syntomis swinhoei Leech, 1898, The Entom., 31, p. 152; 1898, Trans. Ent. Soc. London, p. 322. — ORIGINAL DESCRIPTION: "Allied to *S. actea*, Swinh., but the frons and head are black; the fronts of the tegulae and the metathorax are marked with yellow. The abdomen of male has seven yellow bands, and that of the female six. On the primaries the black along fifth vein between the discal bar and marginal border is narrower, as also is the marginal border of secondaries. Expanse, ♂ 35 millim., ♀ 36 millim." (Leech, 1898).

Syntomis actea ssp. 1 Hampson, 1898, Cat. Lep. Phal., 1, p. 64.

Syntomis actea ssp. *swinhoei* Hampson, 1898, *op. cit.*, p. 537; Seitz, 1909, Gross-Schm. Erde, 2, p. 40; 1913, *op. cit.*, 10, p. 74; Zerny, 1912, Wagner's Lep. Cat., 7, p. 19; Wu, 1938, Cat. Ins. Sin., 4, p. 629.

Amata actea swinhoei Fletcher, 1925, Cat. Ind. Ins., 8, p. 7.

Male. Antennae bipectinate, black, presumably white tipped (in the holotype the antennae tips are broken). Head entirely black. Patagia black, yellow laterally; tegulae yellow with black end-hairs. Thorax black with a large, yellow, posterior patch;

pectus with yellow, lateral patches. Abdomen black; first tergite with yellow lateral patches; second to seventh segments (incl.) with yellow postsegmental bands. Wings hyaline with veins and borders black, the latter enlarged at the apex. Forewing, moreover, with a black, subquadrate discal spot and a black ray along the vein M_2 from the discal spot to the black wing borders; these latter with a truncate tooth between the veins Cu_1 and Cu_2 ; subcostal and supradorsal areas black. Hindwing with the subcostal area and the middle cell black. Length of the forewing: 16 mm.

Female. Similar to the male but antennae serrate, black, white tipped. Abdomen with the first tergite patched not only laterally but also with presegmental and postsegmental yellow patches at the middle; all yellow abdominal bands dilated at the middle; seventh segment without any band. Length of the forewing: 17 mm.

Male Genitalia (Pl. 2, fig. 6). Like those of *hocnei* (cf. below), but differing from them as follows: Tegumen broader; uncus with a more curved tip. Both valvae almost equally long; the lower distal angle of the left valva stout, the upper angle directed more upward; in the right valva the upper distal angle more acute.

Types. Holotype, male, Mupin, Province Szechwan, June, Kricheldorff (preparation of genitalia no. 223; B.M.); allotype, female, Chiatingfu, Province Szechwan, July, A. E. Pratt (B.M.).

Range. Chinese province Szechwan.

Remarks. The acquaintance of the author with this species is based on photographs of the type specimens in the British Museum and the male genitalia of the holotype; certain characters of the markings of those specimens were verified by Mr. S. G. Kiriakoff at the author's request.

This species was considered by Hampson (1898) as a subspecies of *actea* Swinh., while in point of fact *swinhoei* differs from *Caeneressa actea* (Swinh.) (Pl. 2, figs. 1-3) both superficially and in the male genitalia. The frons of *actea* is yellow in the female; the eighth abdominal segment of the male (seventh of the female) is yellow; in *swinhoei* it is black. The male genitalia of *actea* are very typical: uncus deeply undulate, gibbous before a rather narrow and long tip; saccus rather short; the right valva with the lower distal angle pointed and the upper

angle broadly rounded, underdeveloped; the left valva much narrowed distally, with an almost straight, sharply pointed lower distal angle. Aedoeagus of *actea* is shorter and thicker than in *swinhoei*.

For a discussion of distinguishing features of very similar *hoenei*, *dispar* and *zernyi*, refer below to the descriptions of these species.

6. CAENERESSA HOENEI, new species

Pl. 1, figs. 9, 10

Male. Antennae bipectinate, black, the apical part of the shaft white. Head black; frons yellow. Patagia black; tegulae yellow with black end-hairs. Thorax black with a posterior yellow patch; pectus with two yellow patches on each side. Legs concolorous with the body; the interior side of the coxae entirely yellow. Abdomen black; first tergite with lateral yellow patches; yellow postsegmental bands (dilated on the ventral side) on the following six segments; the tip of the abdomen black with bluish-violet gloss.

Wings hyaline with black veins and narrow (at the apex dilated) black borders. In the forewing a black, subrectangular discal patch; the vein M_2 connecting this patch with the wing border black scaled; a broad, truncate tooth on the interior side of the black wing border between the veins Cu_1 and Cu_2 ; subcostal and supradorsal areas of the forewing black. Hindwing with very narrow black borders slightly dilated at the apex. Reverse of both wings with a strong yellowish scaling along the costa and the dorsum, on interior edges of the black wing borders, partly also along the veins. Length of the forewing: 15-19 mm.

Female. Similar to the male. Antennae serrate. Head entirely black. Coxae of all legs yellow streaked. Yellow bands, narrower on the ventral side, on second to sixth abdominal segments (incl.).

Male Genitalia (Fig. 6). Tegumen elongate, moderately arched; uncus long, equally curved; saccus long and rather narrow. Valvae asymmetrical, the right one longer; upper and distal edges not differentiated from one another; the distal part of the valva subrectangular, with a truncate-concave edge and

upper and lower angles both acute and longer on the right valva; saccus long and wide; processus basales narrow, dilated at tips. Vallum penis with two lateral dentate plates joined to the tips of processus basales. Fultura inferior rounded, inversely heart-shaped. Aedoeagus slender and very long, slightly curved downward at the coecum penis and upward at the tip; a single, thorn-shaped cornutus.

Types. Holotype, male, Tapaishan in Tsiuling, Province Shensi, 1700 m. alt., July 7, 1936; allotype, female, of the same locality and date; three male paratypes taken July 7 to 10, 1936, H.

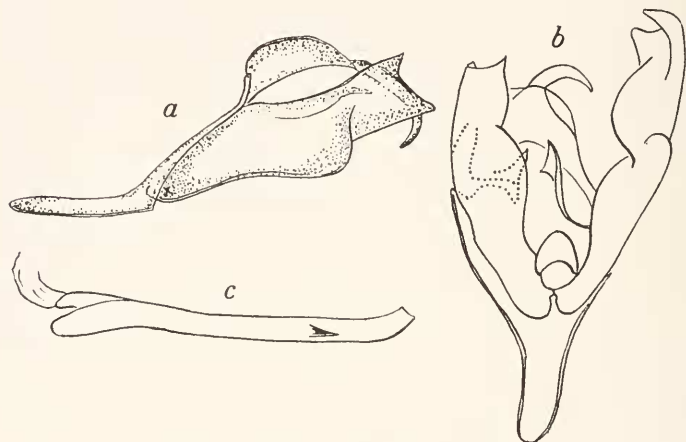


Fig. 6. Male genitalia of *Caeneressa hoenei*, new species; preparation no. S.047 (Z.C.M.).

a, lateral view; b, ventral view; c, aedeagus.

Höne (M.K.). A further male paratype from the same locality (preparation of genitalia no. S.047; Z.C.M.).

Range. The species is known from the above locality only.

Remarks. From *swinhoci* Leech to which the new species is closely related, it differs in having black patagia and a yellow frons in the male. *C. hoenei* also resembles *actea* Swinh., *dispar* n. sp. and *zernyi* n. sp. but in *actea* the frons is black in the male, yellow in the female, and the patagia and the anal abdominal segments are yellow. Both sexes of *dispar* have entirely yellow head and patagia, and the yellow abdominal bands are almost

joined together; *zernyi*, in which the female is unknown, has an entirely black head. The genitalia of all these species are unlike those of *hoenci*.

7. CAENERESSA DISPAR, new species

Pl. 4, figs. 1, 2

Male. Antennae bipectinate, dark brown, the two apical thirds of their shafts yellowish. Head, patagia, and tegulae yellow. Thorax brownish black with a posterior yellow patch; pectus with two yellow patches on each side. Legs brownish, diffusely yellow scaled. Abdomen black; first tergite with a yellow rectangle, black patched in the middle; second to seventh segments (incl.) with postsegmental yellow bands joined at the middle line, each of the tergites consequently with two dorsolateral black patches; eighth tergite black postsegmentally with yellow hairs; sternites whose scaling is very damaged may presumably be entirely yellow.

Wings hyaline, veins and narrow borders (dilated at the apex) brownish black. Forewing, moreover, with a brownish-black discal patch; vein M_2 rather more blackish scaled, supradorsal area black; subcostal area with longitudinal hyaline streak. Costa of the hindwing broad black; upper part of the middle cell hyaline. Length of the forewing: 16 mm.

Female. Similar to the male from which it differs as follows: Antennae serrate, with short, yellowish-white tips. Head black; frons, cheeks and vertex diffusely yellow scaled. Legs black. Abdomen with bands as in the male but on first to sixth tergites (incl.) only; the joining of bands not so clear; anal segments and all sternites black. The black pigmentation of the body more intensive and the yellow markings more orange. Black markings more dilated in both wings, and the black forewing borders with a distinct, broad tooth at the vein Cu_2 . Length of the forewing: 18-19 mm.

Male Genitalia (Fig. 7). Tegumen with two lateral appendages curved upward; uncus rather long, moderately curved; saccus rather long. Valvae short, almost symmetrical; sacculus narrow; the terminal part of the valva much narrower than the basal part; the upper distal angle slightly acute; processus basales

straight, extending to the vallum penis. Fultura inferior elongate-ovate, with a concave upper edge. Aedoeagus comparatively large, slightly curved; three thorn-like cornuti.

Types. Holotype, male, Kuatun ($27^{\circ}40'$ N. and $117^{\circ}40'$ E.), Province Fukien, 2300 m. alt., May 19, 1938, J. Klapperich (genitalia preparation no. S.048; M.K.); allotype, female, the same locality, May 6, 1938, J. Klapperich (M.K.); paratype, female, April 25, 1938, the same locality and collector (Z.C.M.).

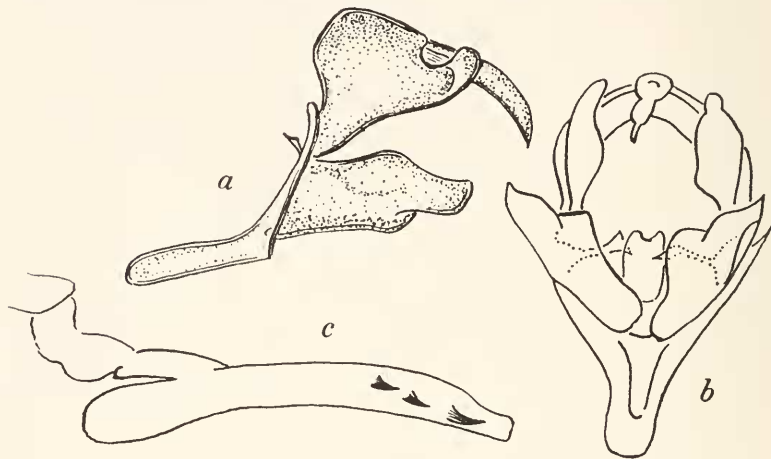


Fig. 7. Male genitalia of *Caeneressa dispar*, new species; preparation no. S.048 (M.K.).

a, lateral view; *b*, ventral view; *c*, aedoeagus.

Additional material examined. Female, Shanghai, Province Chekiang, H. Höne (M.K.).

Range. Chinese provinces Fukien and Chekiang.

Remarks. The similarity of both sexes in certain characters and the fact that the moths were found in the same locality within a comparatively short time period, argues in favor of considering them conspecific. If this is not the case, the female may be considered as a new species because it is unlike any other known species.

The female specimen from Shanghai has an abdominal pattern like that in the male holotype; in the rest of its characters it

does not differ from the Kuatun females except that the black wing markings are rather more developed and some of the hyaline areas are more spot-like.

Some similarity exists between *dispar* and *actea* Swinh., *swinhoei* Leech, and *zernyi* n. sp., but all these species have their abdominal bands free, not joined. The male genitalia and some other characters in the above species are unlike those of *dispar*. The male of *dispar* recalls slightly the Formosan *Amata karapinensis* (Strd.) but the latter is not a *Caeneressa* species.

8. CAENERESSA ZERNYI, new species

Pl. 4, fig. 3

Male. Antennae bipectinate, black, the apical third of their shafts white. Head, patagia, and thorax black; tegulae yellow with black end-hairs. Legs brown. Abdomen black with the first tergite orange patched (the scaling of the remaining abdominal segments is damaged, and only some orange scales indicate that bands were originally present).

Wings hyaline with veins and borders black. Forewing with a subquadrate, black discal patch; a black ray along the vein M_2 joins the discal patch with the dilated apical border; a truncate interior tooth of the black wing border between the veins Cu_1 and Cu_2 ; subcostal and supradorsal areas black. Hindwing with black borders dilated at the apex; costa and the middle cell black. Length of the forewing: 16 mm.

Male Genitalia (Fig. 8). Tegumen scarcely developed; uncus very long, curved, dilated at the base and before the narrow, rounded tip; (the sacculus is missing). Valvae symmetrical; sacculus well developed, broad, rather flat; the upper edge of the valva almost straight to the distal angle; the apical part of the valva narrow and elongate; processus basales much longer than the vallum penis, curved, arranged caudad. Fultura inferior irregularly shaped, narrow in the upper part and dilated in the lower. Aedoeagus slender, moderately long, slightly curved, with a moderate coecum penis; a single, thorn-shaped cornutus.

Type. Monotype, male, Shichow near Canton, Province Kwangtung (genitalia preparation no. S.008; Z.C.M.).

Remarks. This species was identified by Dr. H. Zerny (Vienna)

as new but was not described. It is superficially similar to *actea* Swinh., *swinhoei* Leech and *dispar* n. sp. but differs from them in the black patagia. From *hoenei* n. sp. it differs in having an entirely black head. The peculiar processus basales and the uncus of *zernyi* are unlike those of the remaining known *Caeneressa* species.

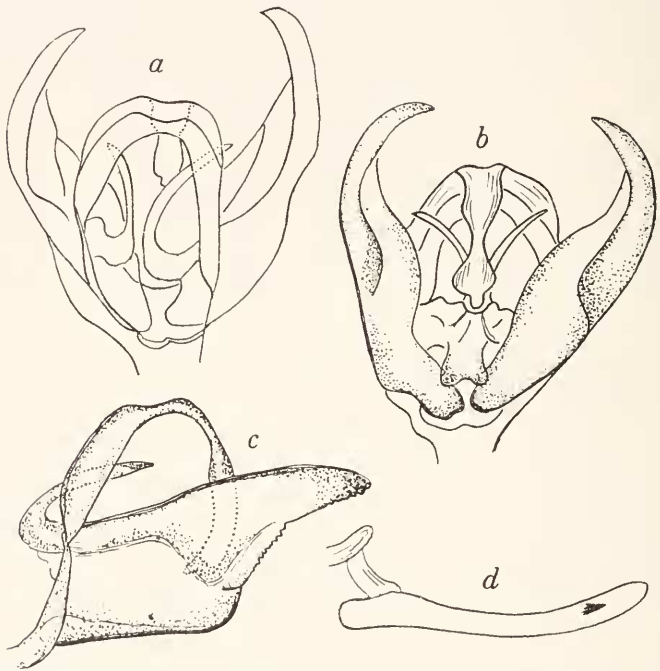


Fig. 8. Male genitalia of *Caeneressa zernyi*, new species; preparation no. S.008 (Z.C.M.).

a, dorsal view; b, ventral view; c, lateral view; d, aedeagus.

9. CAENERESSA NINGYUENA, new species

Pl. 4, fig. 4

Female. Antennae deeply serrate, black, one-fourth white tipped. Head red; a narrow streak between the eyes and the mouth parts, black. Patagia entirely red; tegulae red with

brownish-black end-hairs. Thorax black with a posterior red patch; pectus with two red patches on each side. Legs entirely black. Abdomen black with six broad, red, postsegmental bands on first to sixth tergites (incl.).

Wings hyaline with black veins and borders. Forewing with the borders broadly dilated at apex and forming a broad, interior tooth at the vein Cu_2 ; a broad, black discal spot sending a ray along the vein M_2 to the border; subcostal and supradorsal areas rather diffusely black scaled. Hindwing borders narrow, dilated only at the apex; costa and the greatest part of the middle cell black. Length of the forewing 15 mm.

Type. Monotype, female, mountains near Ningyuenfu, Province Szechwan (Z.C.M.).

Remarks. Because of its red pigmentation, *ningyuena* may be compared with *rubrozonata* Pouj. to which it has no other similarity. The female of *rubrozonata* has simple antennae; only its frons, not the whole head, is red; the red pigmentation on the tegulae and the pectus is less developed, the thorax is entirely black. Also the postsegmental edge of the seventh abdominal sternite is distinct in both species (Fig. 12). From *graduata* Hmps., also red-pigmented, *ningyuena* can be distinguished by its broader forewing shape, less developed black wing markings, and absence of the longitudinal red lines on the abdomen. The antennae of *graduata* are simple in the female.

10. CAENERESSA OENONE (Butl.), new combination and renewed status

Syntomis diaphana var. ? Walker, 1854, List. Spec. Lep. Ins. B. M., 1, p. 126. — ORIGINAL DESCRIPTION: "Nigro-viridis, flavo varia; antennae nigrae serratae, apice albae; alae hyaline subluridae, purpureo-fusco marginatae, anteciae purpureo-fusco fasciatae. Blackish green. Head pale yellow; vertex black. Proboscis tawny. Antennae black, serrated along the whole length, white above towards the tips. Thorax with an interrupted yellow band in front, and with a large subtriangular yellow mark on each side; scutellum and pectus mostly yellow. Wings hyaline, with a slight lurid tinge; borders, band on the tip of the discal areolet, and an opposite mark on the hind border purplish brown. Abdominal segments with more or less interrupted yellow bands. Legs blackish brown. Length of the body 6 lines; of wings 14 lines." (Walker, 1854).

Syntomis oenone Butler, 1876, J. Linn. Soc. London, Zool., **12**, p. 344; Swinhoe (and Cotes), 1887, Cat. Moths Ind., p. 49. — ORIGINAL DESCRIPTION: “*S. diaphana*, var. ♀, Walker (*nec* Kollar) is a distinct species, and may be named *S. oenone*.” (Butler, 1876).

Zygaena vitreata (part.) Kirby, 1892, Synon. Cat. Lep. Het., **1**, p. 95.
Syntomis diaphana (part.) Hampson, 1892, Fauna Brit. India, Moths, **1**, p. 216; 1898, Cat. Lep. Phal., **1**, p. 67; Seitz, 1909, Gross-Schm. Erde, **2**, p. 40; Zerny, 1912, Wagner's Lep. Cat., **7**, p. 20.

Antennae shortly bipectinate in the male, serrate in the female. In other respects, this species cannot be distinguished from *C. diaphana* (Koll.).

Male Genitalia. Uncus rather longer than in *diaphana*, with a more prolonged and acute tip; saccus larger; valvae somewhat broader. Fultura inferior almost regular ovate.

Type. Holotype, male, North India (B.M.).

Additional material examined. Five males and five females, Kooloo, Himalaya, Carleton (preparation of male genitalia no. 1, Obr.; M.C.Z.).

Range. Western Himalaya.

Remarks. Although this species has been not found within the limits of China, its presence in the Western Himalaya and a great similarity to *diaphana* Koll. are reasons for including it in the present revision. Walker (1854) described the antennae of *oenone* as “serrated along the whole length.” This is an evidence that he correctly distinguished between *oenone* and *diaphana*. The later authors neglected this feature and ranked *oenone* to *diaphana*. As matter of fact, the antennae of *oenone* are shortly bipectinate in the male, but without a good magnifier seem serrate; those of *diaphana* seem, under the same conditions, simple, and Hampson (1898) therefore placed this moth among the species with antennae simple in both sexes.

The series of the *oenone* moths examined at the Museum of Comparative Zoology, represent specimens with markings like those of the nominotypical subspecies of *diaphana*. It is very significant that one *diaphana* female specimen was also caught in Kooloo.

11. CAENERESSA DIAPHANA (Koll.), new combination

The synonymy is given under subspecies.

Male. Antennae serrate, black, apical part of the shaft white

above. Head black; frons and narrow streaks behind the eyes white, cream-white, yellow or orange. The ground of the whole body black, often with a greenish, violet, or bronze reflection. Patagia from cream-whitish to orange, in the middle usually divided by black; tegulae concolorous with the patagia, with black end-hairs. Thorax with a broad transversal, whitish, yellow or orange, posterior patch; this patch is often divided into two patches; the middle part of the thorax sometimes with two longitudinal, concolorous lateral streaks; pectus with two similar patches on each side. Legs black or dark brown, often with a bronze or greenish reflection; sometimes the femora and tibiae with whitish or yellow longitudinal streaks, and the inner surface of the coxae is of the same color; first joint of the tarsi sometimes whitish. Abdomen with whitish, yellow or orange bands on seven segments; at least some of these bands dorsally narrowed or interrupted at the middle; some of the anterior bands often paler than the remaining bands; on the ventral side the bands are usually somewhat paler; the anal segment black or yellow.

Wings predominantly hyaline with black veins and borders. In the forewing these borders are always dilated at the apex, usually more or less dilated at the vein M_2 and between the veins Cu_1 and Cu_2 ; discocellulars with a more or less broad, black spot; along the vein M_2 usually a black ray joining the discal spot with the wing borders. All these black markings are variously developed, and the hyaline area is sometimes reduced to separate spots: a long spot (m_{1+3}) below the middle cell extends nearly from the wing base to the tornus; a wedge-shaped spot (m_2) in the middle cell; a more or less large extra spot above the base of the vein Cu_2 ; three larger, elongate spots (m_4 to m_6), between the veins R_5 and M_1 and M_3 and Cu_1 form (together with two smaller and narrower extra spots above and beneath the spot m_4) an exterior row of forewing spots. The basal parts of the forewing veins often yellow. In the hindwing the black borders dilated at the apex and slightly indented at the vein Cu_2 ; the middle cell locked by a black discal spot. A stronger development of the black markings may make two spots of the whole hyaline area of the hindwing; they are almost separated from each other by the vein Cu_2 . Middle cell and dorsum of the hindwing often whitish or yellowish sealed. Length of the forewing: 15-25 mm.

Female. Similar to the male. Antennae simple. Abdomen with six whitish or orange bands. Length of the forewing: 17-30 mm.

Male Genitalia (Fig. 1). Tegumen elongate, arched; uncus long, curved, dilated toward the tip and then pointed; in the dorsal view the uncus is equally narrowed from the base to the tip; saccus broad, short. Valvae almost symmetrical, or the left valva is somewhat shorter, both leaf-shaped; sacculus moderately thickened; distal edge of the valva more or less dentate; processus basales extend to the vallum penis. Fultura inferior rounded. Aedoeagus moderately thickened, slightly curved at the middle; coecum penis moderate, broadly rounded; cuneus composed of numerous, diffusely arranged, small, sclerotized cones and a plate on the vesica.

Female Genitalia (Fig. 2). Discussed in the description of the genus.

Range. From Kashmir and North India through most of China and Indo-China to the Great Sunda Islands; Formosa.

Remarks. In the limits of its range, this species is found in three subspecies. They have no difference in the genitalia and are linked together by intermediate forms.

11a. CAENERESSA DIAPHANA DIAPHANA (Koll.), new status

Pl. 3, figs. 1-4

Syntomis diaphana Kollar, 1848, Hügel's Kaschmir, 4, part 2, p. 460, pl. 19, fig. 7; Walker, 1854, List. Spec. Lep. Ins. B. M., 1, p. 126; Herrich-Schäffer, 1858, Samml. neuer oder wenig bek. aussereurop. Schmett., p. 72; Swinhoe (and Cotes), 1887, Cat. Moths Ind., p. 47; Hampson, 1892, Fauna Brit. India, Moths, 1, p. 216; Swinhoe, 1895, Trans. Ent. Soc. London, p. 31; Hampson, 1898, Cat. Lep. Phal., 1, p. 67; Snellen en Piepers, 1904, Tijdschr. v. Ent., 47, p. 51, 53; Seitz, 1909, Gross-Schm. Erde, 2, p. 40; Zerny, 1912, Wagner's Lep. Cat., 7, p. 20; Seitz, 1913, *op. cit.*, 10, p. 74, pl. 9g [fig. 4].—ORIGINAL DESCRIPTION: "Alis diaphanis, marginibus, macula in anticis costali nervisque nigris; fronte, maculis humeralibus, metathoracis cingulisque abdominalis, medio interruptis, flavis. Expans. alar. 1", 8" (mas.)—2", 1½" (femin.)." "Die grösste mir bekannte, sehr ausgezeichnete Art. Die Flügel alle glashell, durchsichtig, nur ihre Ränder und die Adern schwarz. Auf den Vorderflügeln erstreckt sich an der Spitze die schwarze Färbung am weitesten nach innen, dann verbindet beiläufig in der Mitte ein schwarzer Fleck die beiden Hauptäste der Flügeladern,

und entsendet einen schmalen Streifen nach der Spitze hin; auch vom Aussenraude, nahe am hinteren Winkel wird der schwarze Saum breiter. Die Adern sind verhältnismässig dick. Die schwarze Einsäumung der Hinterflügel ist ziemlich gleichförmig und das durchsichtige Feld nur von drei feinen Adern durchzogen. Die Stirne, beiderseits ein Schulterfleck, ein in der Mitte unterbrochener Querstreifen am Hinterrücken gelb, auch der Hinterleib erscheint mit sieben in der Mitte unterbrochenen, beim Manne ockergelben, beim Weibchen mehr lichtgelben Ringen. Die Fühler sind schwarz, gegen die Spitze weiss bestäubt." (Kollar, 1848).

Syntomis vitreata Herrich-Schäffer, 1855, Samml. neuer oder wenig bekannt. aussereurop. Schmett., pl. 50, fig. 267. There exists no description of *vitreata*, only a figure has been published. In the text accompanying the plates, Herrich-Schäffer considered this name as synonymous with *diaphana* Koll. to which the figure of *vitreata* has an undoubted similarity.

Hydrusa baiaea Swinhoe, 1891, Trans. Ent. Soc. London, p. 473, pl. 19, fig. 10; Kirby, 1892, Synon. Cat. Lep. Het., 1, p. 902; Hampson, 1892, Fauna Brit. India, Moths, 1, p. 222; Swinhoe, 1895, Trans. Ent. Soc. London, p. 32. — ORIGINAL DESCRIPTION: "♂ ♀. Palpi and antennae black, antennae white above towards the tips; frons, head, and body bright ochreous; space between the antennae, a thin band behind, three longitudinal stripes on thorax, which meet in a band before and behind, segmental bands on abdomen, and extreme tip, deep black. Wings mostly hyaline, with black veins and borders. Fore wings with the costal line black, the band on discal-cellular broadly black, the black colour on the lower discoidal veinlet and on the first and second median veinlets thickening towards the irregular marginal band, some ochreous colour on the veins towards the base and on the space below the submedian vein. Hind wings with the costa broadly black, and with a marginal band somewhat as on fore wings. Under side as above; legs black, streaked with ochreous grey; tarsi for the greater part whitish. Expanse of wings, $1\frac{1}{10}$ in." (Swinhoe, 1891).
NEW SYNONYM.

Hydrusa diaphana Swinhoe, 1892, Cat. East. and Austral. Lep. Het., 1, p. 51.

Zygaena diaphana Kirby, 1892, Synon. Cat. Lep. Het., 1, p. 95.

Zygaena vitreata Kirby, 1892, *op. cit.*, p. 95.

Syntomis baiaea Hampson, 1897, J. Bombay N. H. Soc., 11, p. 284; 1898, Cat. Lep. Phal., 1, p. 67; 1900, J. Bombay N. H. Soc., 13, p. 47; Seitz, 1913, Gross-Schm. Erde, 10, p. 74, pl. 9f [fig. 9].

Syntomis muirheadi (non Fldr.) Hampson, 1898, Cat. Lep. Phal., 1, pl. 3, fig. 13; Sonan, 1941, Trans. N. H. Soc. Formosa, 31, p. 96.

Syntomis horishana Matsumura, 1911, Thousand Ins. Jap., Suppl., 3, p. 69,

pl. 35, fig. 19; Wileman, 1929, Trans. Ent. Soc. London, **76**, p. 429; Matsumura, 1931, 6000 Illustr. Ins. Jap., p. 995, fig.—ORIGINAL DESCRIPTION: “♀. Fore wing yellowish, hyaline in certain lights reflecting blue; costa, outer and hind margin, a spot upon the cross vein, a longitudinal stripe each upon the veins III and V, as well as the total veins dark brown; at the hind margin with a yellow stripe. Hind wing just like the fore wing, veins except II yellowish, costa and outer margin as well as the vein II dark brown. Body dark brown, frons, collar, tegulae, mesonotum in the middle, a broad band to each segment of the abdomen and pygidium yellow. Legs dark brown, tarsi somewhat paler. Length: 16 mm.; exp. 48 mm.” (Matsumura, 1911). NEW SYNONYM.

Syntomis hoppo Matsumura, 1911, Thousand Ins. Jap., Suppl., **3**, p. 70, pl. 35, fig. 20; Wileman, 1929 Trans. Ent. Soc. London, **76**, p. 431; Matsumura, 1931, 6000 Illustr. Ins. Jap., p. 995, fig.—ORIGINAL DESCRIPTION: “It differs from *S. horishana* m. as follows: ♀. 1. Hyaline spot of the cell 1b somewhat narrower. 2. Veins of the hind wing dark brown. 3. Frons, collar, tegulae orange yellow. 4. Abdomen orange yellow, to each segment with a spindle shaped black band, 2 last segments black, shot with blue. Length: 16 mm.; exp. 48 mm.” (Matsumura, 1911). NEW SYNONYM.

Syntomis bajaca Zerny, 1912, Wagner's Lep. Cat., **7**, p. 19.

Amata baiaca Fletcher, 1925, Cat. Ind. Ins., **8**, p. 8.

Amata diaphana Fletcher, 1925, *op. cit.*, p. 11; Candèze, 1927, Enc. Ent., ser. B, Lepidoptera, **2**, p. 74; Joannis, 1928, Ann. Soc. Ent. France, **97**, p. 245.

Syntomis muirheadi ab. *horishana* Kawada, 1934, Cat. Ins. Jap., **5**, Lep. Syntomidae, p. 2.

Syntomis muirheadi ab. *hoppo* Kawada, 1934, *loc. cit.*

Wings mostly hyaline with the black only on their borders. discocellulars, and other veins. The hyaline areas separated by veins and merely by a black ray along the forewing vein M_2 . The interior tooth of the forewing terminal border between the veins Cu_1 and Cu_2 never meets the middle-sized discocellular patch and just along these veins reaches sometimes to the middle cell. Patagia yellow; thorax with or without longitudinal yellow streaks; yellow abdominal bands interrupted at the middle, at least on two basal tergites.

Types. *Syntomis diaphana*: Holotype, male, and allotype, female, Masuri, N. W. Himalaya (location of types unknown); *Hydrusa baiaca*: holotype, male, Khasia Hills, Assam (B.M.); *S. horishana*: monotype, female, Horisha, Formosa (Hokkaido

Imperial University, Sapporo); *S. hoppo*: monotype, female, Hoppo, Formosa (the same collection).

Additional material examined. One female, Kooloo, Himalaya, Carleton (M.C.Z.); one female, Morendro Doonai, Shillong, Assam, 1936 (M.L.); two males (genitalia preparation no. S.002; Z.C.M.) and one female (Zoological Museum of the Kiev State University), Ningyuenfu, Province Szechwan; one female, Kiu-huashan, Province Anhwei, September, 1932, G. Liu (M.C.Z.); two females, Chiangmai, Siam, October 26-28, 1920 (A.M.N.H.); three males (A.M.N.H.) and one female (genitalia preparation no. Ct. 9; M.L.), Java; one male and one female, Tjibodas, Java, 1400-1800 m. alt., November 1-20, December, 1927, H. Burgeff (Z.C.M.); two males and two females, the same locality, April 1-10, 1907 (male genitalia preparation no. 2, Obr.; M.C.Z.); two males, Mt. Gede, Tjibodas, Java, April, 1909, Bryan and Palmer (genitalia preparation no. 4519 W.D.F.; U.S.N.M.); one male and one female, Gedeh, W. Java, 1350 m. alt., 1893; 1600 m. alt., 1887 (M.L.); one male, Sindinglaya, W. Java, 1885 (M.L.); one female, Preanger, W. Java, 5000 ft. alt., Sythoff (M.L.); one male, "Java Sea" (M.L.); two males (genitalia preparation no. Ct. 3; M.L.) and one female (M.C.Z.), without data.

Range. Kashmir; N. W. Himalaya; Chinese province Szechwan; S. China; from N. India to Burma; Indochinese Peninsula; Great Sunda Islands; Formosa.

Variation. The chief characters of the subspecies are more or less stable except for the width of the black wing borders and the yellow body pigmentation which may vary from specimen to specimen. All intermediate forms between the more yellow pigmented *baiaea* and the less yellow pigmented *diaphana* were found, and there is no necessity to separate these forms under special names. The same should be said of *horishana* and *hoppo* which are only synonyms for *diaphana*. The extreme individual forms are the following two.

ab. MELAS Wkr., new status (Plate 3, fig. 4)

Syntomis melas Walker, 1854, List. Spec. Lep. Ins. B. M., 1, p. 133; Butler, 1877, Illustr. Het. B. M., 1, p. 17, pl. 6, fig. 10; Swinhoe (and Cotes), 1887, Cat. Moths Ind., p. 49; Seitz, 1913, Gross-Schm. Erde, 10, p. 73, pl. 9g [fig. 5]; Wileman, 1929, Trans. Ent. Soc. London, 76.

p. 430, pl. 20, fig. 12.— ORIGINAL DESCRIPTION: "Purpureofusca, albido varia; proboscide fulva; palpis antennisque nigris, his apice albis; abdomen albido subinterrupte fasciatum; alae hyaline, longae, subluridae, marginalibus venisque infuscatis. Purplish brown. Head whitish in front, on each side and beneath. Proboscis tawny. Palpi and antennae black, the latter white above towards the tips. An interrupted band on the prothorax, four broad stripes on the mesothorax and scutellum whitish. Wings hyaline, long, with a very slight lurid tinge, bordered with brown round the margin and along the veins, especially at the tips and across the tip of the discal areolet and along the opposite space of the hind border; a whitish streak along the hind border of the fore wings, and another along the fore border of the hind wings. Abdomen nearly linear; segments from the first to the sixth with whitish bands which are partly interrupted above. Length of the body 10 lines; of the wings 28 lines." (Walker, 1854).

Zygacna melas Kirby, 1892, *Synon. Cat. Lep. Het.*, **1**, p. 94.

Syntomis melacna (nom. emend.) Hampson, 1892, *Fauna Brit. India. Moths*, **1**, p. 216; Swinhoe, 1895, *Trans. Ent. Soc. London*, p. 31; Hampson, 1898, *Cat. Lep. Phal.*, **1**, p. 96; 1900, *J. Bombay N. H. Soc.*, **13**, p. 48; Zerny, 1912, *Wagner's Lep. Cat.*, **7**, p. 23; Wu, 1938, *Cat. Ins. Sinens.*, **4**, p. 630.

Amata melas Fletcher, 1925, *Cat. Ind. Ins.*, **8**, p. 17; Joannis, 1928, *Ann. Soc. Ent. France*, **97**, p. 245.

Amata melacna Candèze, 1927, *Enc. Ent.*, series B, *Lepidoptera*, **2**, p. 75.

Syntomis owstoni subsp. *melas* (ex err.) Wu, 1938, *Cat. Ins. Sinens.*, **4**, p. 631.

Female specimens with the body pigmentation partly whitish instead of yellow, especially on the frons, patagia, tegulae, on the interior side of the fore coxae, and on the abdomen. Some of the abdominal bands are sometimes nevertheless yellow.

Type. Holotype, female, Nepal (B.M.).

ab. ANDERSONI Moore, new status (Plate 3, fig. 3)

Syntomis andersoni Moore, 1871, *Proc. Zool. Soc. London*, p. 244, pl. 18, fig. 1; 1878, *ibid.*, p. 845, 857; 1878, *Anderson's Res. W. Yunnan*, p. 296, pl. 81, fig. 4; Swinhoe (and Cotes), 1887, *Cat. Moths Ind.*, p. 45.

— ORIGINAL DESCRIPTION: "Male and female. Wings hyaline, veins bluish black; body black, with orange-yellow bands: fore wing with the costa and exterior and posterior margins black; space between the submedian vein and posterior margin pale yellow; a broad transverse discicellular black quadrate spot, which is recurved out-

wards: hind wing with the anterior border pale yellow, and having a small discoidal black spot; apex and exterior margin black; posterior margin tinged with yellow. Spot on front of head, coxae, legs above, and band on each segment of abdomen beneath white. Collar round thorax, tegulae, spots on thorax, and band on each segment of abdomen above orange-yellow; tip of abdomen in male purplish black, in female yellowish grey. Proboscis, palpi, antennae, and legs beneath black, the antennae tipped with white. Expanse, ♂ $1\frac{4}{10}$, ♀ $1\frac{3}{4}$ inch." (Moore, 1871).

Zygaena andersoni Kirby, 1892, Synon. Cat. Lep. Het., 1, p. 96.

Syntomis melaena Hampson, 1900, J. Bombay N. H. Soc., 13, p. 50.

Amata flavolavata Rothschild, 1910, Novit. Zool., 17, p. 434; 1912, *ibid.*, 19, p. 375, pl. 3, fig. 24; Hampson, 1915, Cat. Lep. Phal., Suppl., 1, (1914), p. 33; Fletcher, 1925, Cat. Ind. Ins., 8, p. 14. — ORIGINAL DESCRIPTION: "♀. Nearest *A. melaena* Wlk., but distinguishable at once by the last abdominal segment being orange, and not blue-black as in *melaena* and *melaena andersoni*. Frons orange; tegulae and patagia orange; thorax black, orange at hind edge; antennae entirely black; abdomen bright orange with five black rings. Forewing hyaline orange-yellow, costal area between costal and subcostal nervures with basal three-fifths orange-yellow, area between vein 1 and inner margin orange, a black patch on discocellulars, apex and outer margin narrowly black, nervures black, veins 4 and 5 stalked. Hindwing hyaline orange-yellow, outer margin and nervures black. Length of forewing: 27 mm." (Rothschild, 1910). NEW SYNONYM.

Syntomis flavolavata Zerny, 1912, Wagner's Lep. Cat., 7, p. 21; Seitz, 1913, Gross-Schm. Erde, 10, p. 73.

Black wing markings reduced. The costal hindwing margin yellowish. Abdominal bands wide and not interrupted at the middle.

Types. *S. andersoni*: Holotype, female, Yunnan (B.M.); *A. flavolavata*: monotype, female, Khasia Hills, Assam (B.M.)

Remarks. There is no doubt that *diaphana* and *baiaea* are conspecific. The author had at his disposal both these forms and could not find any constant features which would distinguish one form from the other. The specimens like *horishana* and *hoppo* were found among the populations of ssp. *diaphana* from the continental part of China, and Kawada (1934, *loc. cit.*) was right in considering both Formosan "species" as forms of *diaphana* which he erroneously called *muirheadi*. The ab. *melas* was found in almost all parts of the ssp. *diaphana* range; similar female specimens with the yellow abdominal markings replaced by

white, the author studied from Ningyuenfu, Morendro Doonai and Chiengmai, also from Java. In the literature *melas* was mentioned also from Himalaya, Nepal (type), Sikkhim, Burma, and Indochina. This form like ab. *andersoni* has no geographical adaptation. A separation of *flavolavata* from this latter form was unreasonable: Rothschild (1910) was wrong in describing the last abdominal segment of *andersoni* female as blue black. The remaining characters of *flavolavata* and *andersoni*, the yellow tinge of the hyaline wing membrane included, are common and may be observed in any population of ssp. *diaphana*.

11b. CAENERESSA DIAPHANA MUIRHEADII (Fldr.), new status
Pl. 3, figs. 5-9

Syntomis muirheadii Felder, 1862, Wien. Ent. Mschr., 6. p. 37; Leech, 1889,

Trans. Ent. Soc. London, p. 123.—ORIGINAL DESCRIPTION:

“Alis anticis nigricantibus, maculis tribus vittaeformibus aliisque quatuor pone discum hyalinis, posticis, margine costali et externo exceptis, hyalinis, fronte scapulisque luteis, cingulis abdominalibus ochraceis. ♂ ♀.” “Regiones montanas circa Ning-po incolit ista, *S. diaphanae* Kollar affinis. Mas maculas hyalinas exteriores alarum anticarum aliter habet ordinatas quam femina. In eo macula prima inter venam subcostalem et discoidalem superiorem jaceat, in femina inter ramos ultimos subcostales. Macula supra rami mediani primi basin minuta est, in femina autem vittaeformis.” (Felder, 1862).

Zygaena muirheadii Kirby, 1892, Synon. Cat. Lep. Het., 1. p. 95.

Syntomis muirheadii Hampson, 1898, Cat. Lep. Phal., 1. p. 95; Leech, 1898,

Trans. Ent. Soc. London, p. 322; Seitz, 1909, Gross-Schm. Erde, 2. p. 40, pl. 9g [fig. 3]; Zerny, 1912, Wagner's Lep. Cat., 7. p. 24; Seitz., 1913, *op. cit.*, 10. p. 70; Draeseke, 1926, Iris, 40. p. 46; Wileman, 1929, Trans. Ent. Soc. London, 76. p. 421, 429-431, pl. 20, fig. 11; Wu, 1938, Cat. Ins. Sinens., 4. p. 630.

Syntomis muirheadii (ssp. or ab.) *aucta* (non Leech) Hampson, 1898, Cat.

Lep. Phal., 1. p. 95; Seitz, 1909, Gross-Schm. Erde, 2. p. 40; 1913, *op. cit.*, 10. p. 70; Wu, 1938, Cat. Ins. Sinens., 4. p. 630.

Amata muirheadii Fletcher, 1925, Cat. Ind. Ins., 8. p. 17.

Wings with black markings more distributed and hyaline areas forming spots on the black ground. The spot edges, the forewing subcostal area, and the middle cell of the hindwing, often with a taint of yellow scales. Orange-yellow abdominal bands mostly interrupted or considerably narrowed dorsally. Thorax usually with orange-yellow longitudinal streaks well developed.

Types. Allotype, female, Ningpo, Province Chekiang (Tring Museum; cf. Wileman, 1929); holotype, male, is apparently missing.

Additional material examined. Three males and three females, Suifu, Province Szechwan, April 8, 1922, November, D. C. Graham (U.S.N.M.); four males, Shinkaisi, Omeishan, Province Szechwan, 4400 ft. alt., August, D. C. Graham (U.S.N.M.); one female, Chengfu, Province Szechwan, June, D. C. Graham (U.S.N.M.); one female, Chungking, Province Szechwan, September, 1941 (M.K.); one female, Tungjen, Province Kweichow, September 8, 1928, C. B. Wahl (A.M.N.H.); one male, Nanking, Province Kiangsu, June 15, 1933, H. Höne (M.K.); one male, Lungtan near Nanking, Province Kiangsu, June 3, 1933, H. Höne (M.K.); one male, East Tienmushan, Province Chekiang, 1500 m. alt., June 13, 1931, H. Höne (M.K.); one male and one female, the same locality, May 25, 1931, H. Höne (Z.C.M.); three males and one female, West Tienmushan, Province Chekiang, 1600 m. alt., May 29, September 2-3, 1932, H. Höne (M.K.); one male, Mokanshan, Province Chekiang, May 31, 1931, H. Höne (M.K.); four females, Yenping, Province Fukien, June 28, August 8, and September 9, 1917 (A.M.N.H.); one female, Foochow, Province Fukien (U.S.N.M.); one male and two females, Shaowu, Province Fukien, 500 m. alt., May 9 till 24, August, 1937, J. Klapperich (M.K.); one male, the same locality (genitalia preparation no. S.036; Z.C.M.); one male and three females, Kwangtseh, Province Fukien, August 28 till September 7, 1937, J. Klapperich (M.K.); one male, the same locality (Z.C.M.).

Range. Chinese provinces Szechwan, Kweichow, Kiangsu, Chekiang, and Fukien.

Variation. This subspecies varies chiefly in size. The wing pattern is more or less constant; only the varied shape and size of the forewing extra spot above the vein Cu_2 affects the width of the black wing border. The yellow abdominal girdles are mostly well developed; only in one female from Chungking is there no girdle on the second tergite.

Remarks. Hampson (1898) and some other authors ranked *Syntomis aucta* Leech (The Entom., 31, 1898, p. 153) to *muirheadii*, but by mistake. The present author had an opportunity to study the male genitalia of the type of *aucta* on the basis of a photograph received from the British Museum. This examina-

tion showed that *aucta* was an independent species belonging to the genus *Amata* F.

11c. *CAENERESSA DIAPHANA HUNANENSIS*, new subspecies

Pl. 3, figs. 10, 11

From the preceding subspecies this differs by a slight development of the yellow pigmentation of the patagia and thorax. Patagia black with some yellowish scales at the anterior edge; longitudinal yellow streaks of the thorax obsolescent.

Types. Holotype, male (May 30), allotype, female (June 6), and two paratypes (M.K.); two further paratypes, one male and one female (Z.C.M.). The series originates from Hoengshan, Province Hunan, 900 m. alt., May 28 till June 6, September 4, 1933, H. Höne.

Range. Known from the above locality only.

Remarks. Although the distinction between the new subspecies and ssp. *muirheadii* seems minimal, it is constant in all the specimens examined from Hoengshan. On the other hand, not any specimen of *muirheadii*, of the large series examined, has the yellow of the patagia so much reduced as in *hunanensis*. This fact gives the ground for considering the Hunan specimens a separate geographical form.

12. *CAENERESSA GRADUATA* (Hmps.), new combination

Pl. 4, figs. 16, 17

Syntomis graduata Hampson, 1898, Cat. Lep. Phal., 1, p. 67, pl. 2, fig. 28; Seitz, 1909, Gross-Schm. Erde, 2, p. 40, pl. 9f [fig. 4]; Zerny, 1912, Wagner's Lep. Cat., 7, p. 22; Wu, 1938, Cat. Ins. Sinens., 4, p. 629. — ORIGINAL DESCRIPTION: "♂. Head, thorax, and abdomen black; tegulae and a patch on metathorax crimson; abdomen with subdorsal and lateral crimson streaks, the subdorsal streaks conjoined by segmental lines. Fore wing with hyaline streak above vein 1 from near base to near termen, and a series of spots between veins 2 and 5 and 6 and 8, diminishing in size towards costa. Hind wing with hyaline patches below the cell and above vein 2, and spot between veins 3 and 5, which are stalked." "♀ with broad dorsal crimson fascia on abdomen." (Hampson, 1898).

Male. Antennae biserrate, black, short white tipped. Head

black. Patagia red; tegulae black. Thorax black with a posterior red patch; pectus with two red patches on each side. Legs brownish, slightly paler than the body. Abdomen blackish brown; postsegmental, crimson bands on first to seventh tergites (incl.); a crimson mediodorsal and two lateral, longitudinal lines; sternites entirely black. Length of the forewing: 14-15 mm.

Wings black brownish, rather diffusely scaled, with hyaline spots. Forewing with a three-fourths long, slightly arcuate spot (m_{1+3}) below the middle cell; a short, wedge-shaped, sometimes diffusely blackish scaled spot (m_2) in the middle cell; an exterior series of spots consisting of more or less short rectangular spot (m_4) between the veins M_1 and R_5 accompanied by an extra spot above and a little, inconstant extra spot below; two inward pointed spots (m_5 and m_6) between the veins M_2 and Cu_1 , and an extra spot between the veins Cu_1 and Cu_2 bordering on the lower edge of the middle cell; these exterior spots are separated from each other by veins only. Hindwing black bordered, with an elongate hyaline area below the middle cell.

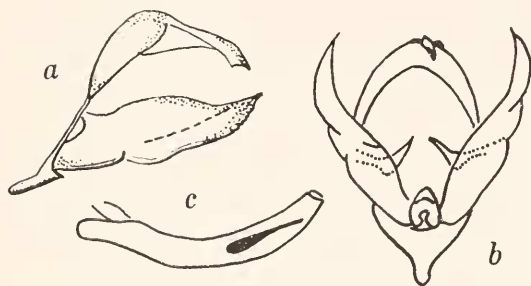


Fig. 9. Male genitalia of *Caeneressa graduata* (Hmps.); preparation no. S.064 (M.K.).

a, lateral view; *b*, ventral view; *c*, aedeagus.

Female. Similar to the male. Antennae simple. Abdomen with a broad, dorsal, longitudinal, crimson fascia.

Male Genitalia (Fig. 9). Tegumen rather narrow; uncus moderately long, dilated and pointed distally; saccus broad, rather short, with a narrow tip. Valvae symmetrical; sacculus short;

costa slightly arched between the upper and distal edges; tip of the valva acute, directed slightly upward; processus basales extending only to the vallum penis. Fultura inferior ovate. Aedocagus moderately sized, curved upward; one single, long cornutus, thickened at the base, very narrowed distally.

Type. Holotype, male, Kiangnan (B.M.).

Additional material examined. One male, Lungtan near Nanking, Province Kiangsu, May 8, 1933, H. Höne (genitalia preparation no. S.064; M.K.).

Range. Chinese province Kiangsu.

Remarks. In the abdominal pattern, this species is similar to *C. tienmushana*, n. sp., but it has crimson bands instead of the yellow ones in the latter species, and otherwise shaped genitalia. From all other *Caeneressa* species, *graduata* differs in its peculiar venation having the hindwing veins M_2 and Cu_1 stalked.

13. CAENERESSA TIENMUSHANA, new species

Pl. 4, fig. 5

Male. Antennae slightly serrate, black, short yellowish tipped. Head black; frons and palpi yellow. Patagia yellow, at the middle blackish; tegulae entirely yellow. Thorax blackish brown; pectus with two yellow patches on each side. Legs brownish, diffusely yellowish scaled, especially on the tarsi; interior side of the coxae yellow. Abdomen brownish black; first to seventh tergites (incl.) with narrow, postsegmental, yellow bands; a yellow mediodorsal and two longitudinal, lateral lines; the corresponding sternites in their greatest part yellow; tip brownish black with sparse, postsegmental, yellow hairs. Length of the forewing: 14 mm.

Wings hyaline with brownish black veins and borders dilated at the apex. Forewing moreover with a broad, brownish black, discal spot and a black ray along the vein M_2 connecting this spot with the wing borders; a border tooth along the vein Cu_2 ; all the hyaline areas more or less spot-shaped; subcostal area yellow. Hindwing narrower, brownish black bordered; dorsum yellow scaled; middle cell and costa brownish black, the latter slightly tinged with yellow. The reverse of both wings with a diffuse, yellow scaling along the costa and dorsum.

Male Genitalia (Fig. 10). Tegumen narrow, moderately curved, dilated distally and with an acute tip; sacculus moderately long, almost straight. Valvae leaf-shaped, the left valva considerably shorter; tip pointed; sacculus rather narrow, slightly thickened, with an obtuse tip; processus basales short, slightly curved at the tips, extending only to the vallum penis. Fultura inferior elongate-ovate. Aedoeagus rather long, slender.

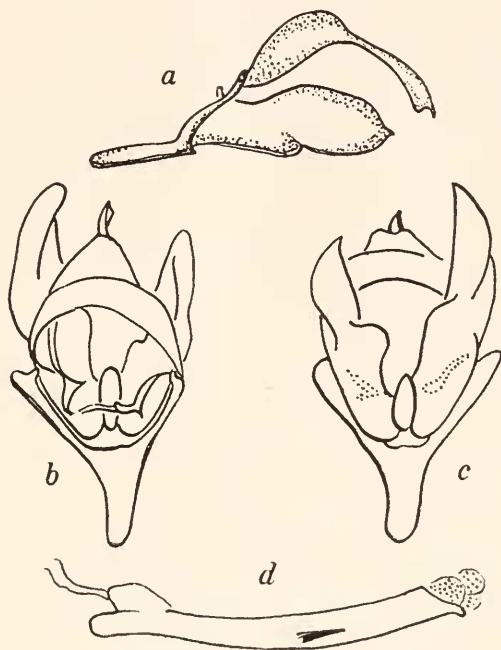


Fig. 10. Male genitalia of *Cacneressa tienmushana*, new species; preparation no. S.051 (M.K.).

a, lateral view; b, dorsal view; c, ventral view; d, aedoeagus.

slightly curved upward; a single, thorn-like cornutus, and a fine, distal cuneus of numerous, little, chitinous cones.

Type. Monotype, male, West Tienmushan, Province Chekiang, June 9, 1935, H. Höne (genitalia preparation no. S.051: M.K.).

Range. Known from the above locality only.

Remarks. Allied to *rubrozonata* Pouj., especially to its ab. *leucoma* Leech, from which the new species differs in its antennae, head color, tegulae, legs, and abdomen, in more enlarged hyaline wing areas, and in genitalia. The wing pattern is somewhat similar to that of *obsoleta* Leech but the forewing spots are less far apart.

14. *CAENERESSA RUBROZONATA* (Pouj.), new combination

The synonymy is given under subspecies.

Male. Antennae slightly serrate or simple, black, short white tipped. Head black; frons white. Patagia black, sometimes shot with reddish or yellowish, especially at sides, seldom entirely red or yellow; tegulae red or yellow with black hair-tufts on the

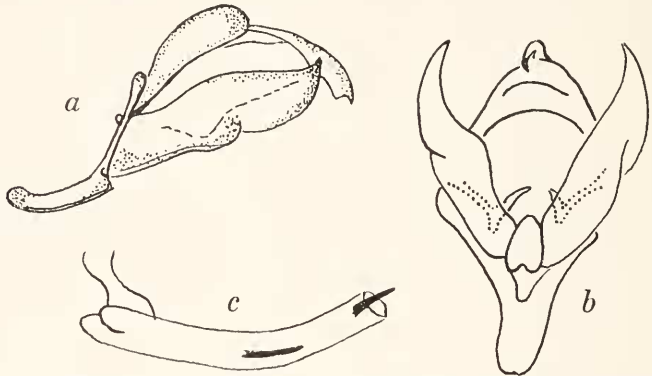


Fig. 11. Male genitalia of *Caeneressa rubrozonata* (Pouj.); preparation no. S.052 (Z.C.M.).

a, lateral view; *b*, ventral view; *c*, aedeagus.

tips, or black with colored shoulders. Thorax black; pectus unicolorous, or with a pale reddish or yellowish patch on each side. Legs black; the interior side of the coxae white, sometimes also the femora and tibiae white or whitish streaked. Abdomen black; first tergite and the further six segments with postsegmental, red or yellow girdles; they are more or less broad, complete or interrupted ventrally, jointed between themselves laterally; those on the second and third tergites often narrower or absent, that on the seventh tergite also absent sometimes. Wings black

with white, hyaline spots. Length of the forewing: 11-16 mm.

Forewing with five ground spots: an elongate-cuneiform spot (m_2) in the middle cell, usually as broad as this latter; a long spot (m_{1+3}) below it, reaching from the wing base almost to the tornus, or the basal part of this spot (m_1) absent; a spot (m_4) in the area between the veins R_5 and M_1 mostly shorter than that (m_6) between the veins M_3 and Cu_1 ; a spot (m_5) between the veins M_2 and M_3 often the smallest in the exterior spots series; sometimes more or less developed extra spots above the vein Cu_2 and at both sides of the spot m_4 . Hindwing with a more or less large spot placed right at the dorsum and separated from it by a narrow black border; occasionally this spot reaches across the vein Cu_1 .

Female. Similar to the male. Antennae simple. Frons reddish, yellowish, grey or black. Legs entirely black. Girdle on the seventh tergite always absent.

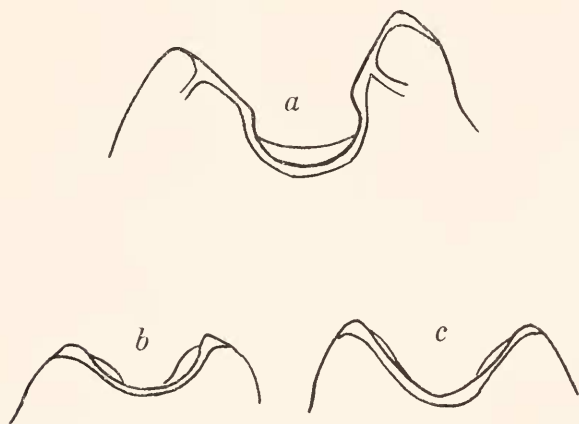


Fig. 12. Postsegmental edge of the seventh abdominal sternite of two *Caeneressa* species; a, *C. ningyuena*, new species; b, c, *C. rubrozonata* (Pouj.).

Male Genitalia (Fig. 11). Like those in *graduata* Hmps., with symmetrical valvae. Aedoeagus equally broad, slightly curved upward, with a small coecum penis; two elongate, sharp cornuti.

Female Genitalia (Fig. 12). The postsegmental edge of the seventh abdominal sternite more or less concave.

Range. Chinese provinces Szechwan, Chekiang, and Fukien.

Variation. Individual variation of the wing and abdomen markings, and of the body color and head scaling. Two geographical subspecies.

Remarks. Hampson (1898) wrote on this species: "both wings with veins 4 and 5 shortly stalked." As a matter of fact, this character is inconstant, and the two veins mentioned are often only coincident.

14a. CAENERESSA RUBROZONATA RUBROZONATA (Pouj.), new status

Pl. 4, figs. 6-9

Syntomis rubrozonata Poujade, 1886, Bull. Soc. Ent. France, ser. 6, 6, p. CXVII; Leech, 1898, Trans. Ent. Soc. London, p. 324; Hampson, 1898, Cat. Lep. Phal., 1, p. 85; Seitz, 1909, Gross-Schm. Erde, 2, p. 40; Zerny, 1912, Wagner's Lep. Cat., 7, p. 25; Draeseke, 1926, Iris., 40, p. 46. — ORIGINAL DESCRIPTION: "Envergure: ♂, 30 mill.; ♀, 32 mill. Ailes hyalines, avec les taches, les nervures et les bords noirs. Les supérieures sont très allongées et assez pointues; la bordure externe s'élargit à l'apex environ du quart de l'aile, où elle est reliée par une bande étroite à une tache presque carrée qui limite la cellule et touche au bord costal; cette bordure s'élargit encore en une tache presque carrée, plus large que la précédente, entre les deux derniers rameaux de la nervure médiane. Ailes inférieures très petites, lanéolées, n'égalant pas en longueur la moitié des supérieures, ayant l'apex jusqu'au tiers de l'aile environ et le bord costal noirs. Tête, thorax et abdomen noirs, se dernier ayant les arceaux supérieures bordés de rouge vermillon; antennes noires, blanches à l'extrémité. Le mâle seul a le front blanc ainsi que la poitrine, le devant des hanches et des lignes sur les cuisses." (Poujade, 1886).

Zygaena rubrizonata Kirby, 1892, Synon. Cat. Lep. Het., 1, p. 93.

The black of the wings considerably reduced; the hyaline spots of the forewing exterior spots series placed near the middle cell. In the male the abdomen not girdled ventrally.

Types. Mupin, Province Szechwan (probably in the Musée d'Histoire Naturelle, Paris).

Additional material examined. Four males and one female, West of Yachow, June, 2000 to 7000 ft. alt., D. C. Graham (U.S.N.M.); one male, Shinkaishi, Omeishan, Province Szechwan, 4400 ft. alt., July, D. C. Graham (U.S.N.M.).

Range. Chinese province Szechwan.

Variation. The nominotypical form has red body markings. That with yellow markings was described as an aberration.

ab. LEUCOMA Leech (Plate 4, figs. 6, 8, 9)

Syntomis consequa Leech, 1898, *The Entom.*, **31**, p. 153; 1898, *Trans. Ent. Soc. London*, p. 324; Hampson, 1898, *Cat. Lep. Phal.*, **1**, p. 96, pl. 5, fig. 2; Seitz, 1909, *Gross-Schm. Erde*, **2**, p. 40, pl. 9e [fig. 1]; Zerny, 1912, *Wagner's Lep. Cat.*, **7**, p. 20. — ORIGINAL DESCRIPTION: "Female. Wings almost exactly identical with those of *S. rubrozonata*, but the frons is greyish, the collar is yellow, and there are six yellow bands on abdomen, the first of which is broad. Expanse, 28 millim." (Leech, 1898). NEW SYNONYM.

Syntomis leucoma Leech, 1898, *The Entom.*, **31**, p. 154; 1898, *Trans. Ent. Soc.*, *London*, p. 324. — ORIGINAL DESCRIPTION: "Frons, tegulae, and fore tibiae white; thorax and abdomen black, the latter with seven yellow bands, the last two of which are almost confluent. Primaries hyaline, venation black; there is a black spot at outer extremity of cell, and this is united by a bar with the broad apical portion of the black outer marginal border; the latter is toothed at veins 2 and 3; there is a curved black streak along inner margin. Secondaries hyaline, with black outer border which is broadest at apex. Expanse, 28 millim." (Leech, 1898).

Syntomis rubrozonata (part.) Hampson, 1898, *Cat. Lep. Phal.*, **1**, pl. 3, fig. 7; Seitz, 1909, *Gross-Schm. Erde*, **2**, pl. 9f [fig. 5].

Syntomis rubrozonata ab. *leucoma* Hampson, 1898, *Cat. Lep. Phal.*, **1**, p. 85; Seitz, 1909, *Gross-Schm. Erde*, **2**, p. 40; Zerny, 1912, *Wagner's Lep. Cat.*, **7**, p. 25.

With yellow body markings instead of red ones.

Types. *Syntomis leucoma*: Monotype, male, Omeishan, Province Szechwan, 3620 ft. alt., May and June, 1890 (B.M.); *S. consequa*: monotype, female, Mupin, Province Szechwan, June, Kricheldorf (B.M.).

Remarks. There is no doubt that *leucoma* and *consequa* are different sexes of the same form although *consequa* has been erroneously considered by most authors as an independent species. I retain for this aberration of *rubrozonata* the first of the two simultaneously-established names because it has already been used in this sense. This aberration is known to me in one male specimen from the above-mentioned series from Yachow.

14b. CAENERESSA RUBROZONATA EURYMELAENA, new subspecies
Pl. 4, figs. 10-15

The black of the wings distributed; the exterior series of the hyaline forewing spots remote from the middle cell. The abdomen of the male usually girdled also ventrally.

Types. Holotype, male, allotype, female, eight males and seven females, paratypes, Kuantun, Province Fukien, 2300 m. alt., May 11 till June 6, July 23 till August 8, 1938, J. Klapperich (M.K.); further paratypes, two males and one female, the same locality (Z.C.M.).

Additional material examined. One male and two females, Mokanshan near Hangehow, Province Chekiang, June 9 till 16, August 7 till 19, 1930, H. Höne (M.K.); one male and two females, the same locality (male genitalia preparation no. S.053; Z.C.M.); one male, West Tienmushan, Province Chekiang, 1600 m. alt., June 28, 1932, H. Höne (genitalia preparation no. S.052; Z.C.M.); one male and one female, East Tienmushan, Province Chekiang, 1500 m. alt., June 7 till 20, 1931, H. Höne (M.K.).

Range. Chinese provinces Chekiang and Fukien.

Variation. As in the preceding subspecies, ab. *leucoma* is known here also (one male from West Tienmushan and one male and one female from East Tienmushan). In six female specimens (one from Mokanshan and five from Kuantun) the patagia are entirely red. Sometimes there are no girdles on the ventral surface (two females from Mokanshan, three males and nine females from Kuantun). Most of the specimens have extra spots in the forewings; they are absent in only four specimens (one male and three females from Mokanshan).

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¹ Synonyms are italicized. Figures in bold-face refer to pages on which the basic discussion is given.